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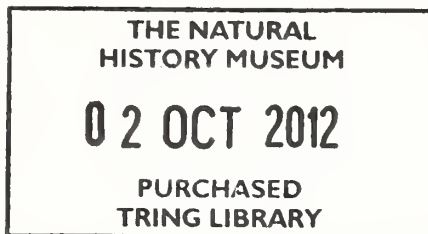
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New bird records from southwestern Burkina Faso

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Summary

We present the results of three bird surveys performed in southwestern Burkina Faso (Cascades Region), documenting ten additional species new to the country: Ovambo Sparrowhawk *Accipiter ovampensis*, Black Sparrowhawk *A. melanoleucos*, Red Phalarope *Phalaropus fulicarius*, Black-shouldered Nightjar *Caprimulgus nigriscapularis*, Red-headed Lovebird *Agapornis pullarius*, Buff-spotted Woodpecker *Campethera nivos*a, Grasshopper Warbler *Locustella naevia*, African Reed Warbler *Acrocephalus baeticatus*, Emin's Shrike *Lanius gubernator* and Tropical Boubou *Laniarius aethiopicus*. Also included are species for which our data represent a range extension within Burkina Faso and a complete checklist of the species observed.

Résumé

Nouvelles observations d'oiseaux dans le sud-ouest du Burkina Faso. Nous présentons les résultats de trois études ornithologiques réalisées dans le sud-ouest du Burkina Faso (Région des Cascades), documentant dix espèces nouvelles pour la région: l'Épervier de l'Ovampo *Accipiter ovampensis*, l'Autour noir *A. melanoleucos*, le Phalarope à bec large *Phalaropus fulicarius*, l'Engoulevent à épaulettes noires *Caprimulgus nigriscapularis*, l'Inséparable à tête rouge *Agapornis pullarius*, le Pic tacheté Woodpecker *Campethera nivos*a, la Locustelle tachetée *Locustella naevia*, la Rousserolle africaine *Acrocephalus baeticatus*, la Pie-grièche à dos roux *Lanius gubernator* et le Gonolek d'Abyssinie *Laniarius aethiopicus*. Sont aussi incluses des espèces pour lesquelles nos données représentent une extension de leur aire de répartition à l'intérieur du Burkina Faso ainsi qu'une liste complète des espèces observées.

Introduction

The field data here reported were collected in November 2003, February 2010 and March 2011 in the Cascades Region, southwestern Burkina Faso. The Cascades Region, like many other parts of Burkina Faso, has received little ornithological attention, most of which has been devoted to the northern and central parts of the country, with a focus on Palaearctic migrants or areas of special interest such as the W-Arly-Pendari National Parks area (Green & Sayer 1979, Thonnerieux 1985, 1988a, 1988b, Thonnerieux *et al.* 1989, Weesie & Belemsobgo 1997, Thiollay 2006, Balança *et al.* 2007, Connor 2010).

Study area and methods

We concentrated our activities in the Banfora area, particularly around Lemorodougou Lake, and in the Classified Forest of Como  -L  raba (see gazetteer in Table 1).

Table 1. Gazetteer with locality codes used in Appendix 1.

	Code	Coordinates		Altitude (m)
Banfora	B	10��30'N	4��45'W	314
Le Copalier campsite	C	9��45'N	4��35'W	232
Kou forest	D	11��12'N	4��20'W	415
Folonzo	F	9��57'N	4��40'W	278
Karfigu��la falls	K	10��43'N	4��49'W	294
Lemorodougou Lake	L	10��41'N	4��48'W	280
Moussodougou Lake	M	10��14'N	4��56'W	475
Karfigu��la marsh	N	10��42'N	4��48'W	286
Galerie �� Roussettes	R	10��35'N	5��18'W	325
Pics de Sindou	S	10��39'N	5�� 9'W	378
Tengrela Lake	T	10��38'N	4��50'W	273

Banfora Area. Lemorodougou Lake (12–13 and 17–18 Feb 2010, 10–14 and 22–23 Mar 2011) covers a surface of < 2 km² and is completely bordered by a thick flooded *Typha* reedbed. The area around the lake is extensively cultivated with rice and millet fields. The area was investigated with mist-nets, direct observation on foot and by boat, and sound recording. Karfigu  la falls (1 Dec 2003, 15 and 17 Feb 2010, 14 Mar 2011), also known as Cascades de Banfora, on the Como   near Banfora, are one of the most important tourist attractions of the region. The water falls from a sandstone cliff *c.* 50 m high. Along the river, especially downstream of the waterfall, a thin but dense gallery forest has developed, with some huge Mango *Mangifera indica* trees

and scattered small cultivated fields, mainly Date *Phoenix dactylifera* orchards. The records here were from mist-netting, direct observation and sound recording. Some observations were made also at the nearby Karfiguéla marsh (22–23 Mar 2011).

Classified Forest of Comoé-Léraba. In this protected area, also reported as Diéfoula-Logoniégou forest (Lungren *et al.* 2001), we made observations in two main localities. Folonzo (27–30 Nov 2003, 5–8 Feb 2010, 16 and 21 Mar 2011) is a village located at the border of the protected area. Habitats near the village include arable fields of millet or cotton, with scattered trees and small dense woods close to water sources. The habitat inside the protected area is mainly open, park-like savanna woodland. This area was surveyed by mist-nets placed close to water sources, and by car. Le Copalier campsite (8–10 Feb 2010, 17–20 Mar 2011) lies south of Folonzo, inside the Classified Forest, along the right bank of the Comoé River. It is characterized by semi-deciduous gallery forest up to 30–40 m high and dry forest of 15–20 m, with temporary swamps generated after river flooding during the rainy season, and a 1-km² dense humid evergreen forest characterized by *Daniellia oliveri*, *Isoberlinia doka*, *Kaya senegalensis* and *Pterocarpus erinaceus* (Guinko 1984). This area was surveyed by mist-nets, direct observation and sound recording, both diurnal and nocturnal.

Tengrela Lake (14 Feb 2010), close to Banfora, is locally famous for its population of a few dozen Hippos *Hippopotamus amphibius*, which have been extirpated by illegal hunting from the other lakes of the Banfora area. This lake is also a well known spot for bird-watching. It is larger than Lemorodougou Lake but much more altered by human activities. The shores are almost completely cultivated and natural vegetation is nearly absent, and floating vegetation is less developed than in Lemorodougou Lake. We spent one morning in the area using a boat and walking around the lake.

Pics de Sindou (16 Feb 2010) is an eroded limestone formation of c. 1.5 km² of peaks and ridges, mostly c. 50 m high with very steep slopes, 42 km east of Banfora. It is well known for its archaeological and ethnographic interest. Its fauna is typical of rocky areas, which are otherwise rare in the Banfora area.

Galerie à Roussettes (16 Feb 2010) is a wetland of 3 km², extensively covered by floating vegetation or semi-submerged trees. A dense gallery forest, inhabited by a huge colony of fruit bats, characterizes the northern part of the area. The area was briefly surveyed on foot.

Moussodougou Lake (16 Feb 2010) is an artificial lake, of c. 6 km², between Sindou and Banfora. It is one of the three largest artificial lakes of the Banfora area. It was surveyed from the dam, so all the southern part of the lake could be observed. It was not possible to see the northern part of the lake where, probably, the water was shallower.

Kou forest (15 Mar 2011), also known as the “Guinguette”, is a Classified Forest consisting of a patch of dense, well preserved forest along a freshwater spring c. 15 km west of Bobo Djoulasso, and is the only forest area of the region, except for the one at Karfiguéla falls.

Opportunistic observations were also made during car trips between the various sites and the base camp, both in the Banfora area and in the Comoè-Léraba Forest.

Our surveys were carried out during the dry season. Birds were recorded through visual observations, tape recording and mist-netting. Nearly all of the observed species were documented by photographs, and some voucher specimens were collected to provide verifiable documentation of distributional records and material for further studies of avian systematic, genetic, morphology, annual cycles and biogeography (Bates *et al.* 2004).

Taxonomy and scientific names follow Borrow & Demey (2001). The distribution of birds in Burkina Faso was evaluated from recent literature (Borrow & Demey 2004, Connor 2010, Kennerley & Pearson 2010) and compared with Brown *et al.* (1982), Urban *et al.* (1986, 1997), Fry *et al.* (1988, 2004), Keith *et al.* (1992), Dowsett & Dowsett Lemaire (1993), PNUE (1999) and Fry & Keith (2000). We have not taken into consideration unchecked bird-watching trip reports, including those found on the internet. To avoid repetition, PNUE (1999) will henceforth be quoted as PNUE and Borrow & Demey (2004) will be indicated as B&D.

Results

We recorded 226 species, including 652 mist-netted individuals of 90 species (Appendix 1). These included ten species new for Burkina Faso (according to PNUE 1999 and Borrow & Demey 2004) and several other interesting records, discussed in more detail below.

Additions to the avifauna of Burkina Faso

***Accipiter ovampensis* Ovambo Sparrowhawk.** One female, killed by local people in Folonzo and given to us on 7 Feb 2010, was prepared as a study skin and preserved in the Museo Civico di Storia Naturale di Carmagnola (MCCI B3237). A second individual, probably a male, was mist-netted, measured and released at Le Copalier campsite on 18 Mar 2011 (Fig. 1). The latter represents the third record for the country since, on 19 Feb 2011, an adult was photographed by C. Gruwier near Karfiguéla falls at *c.* 10°43'N, 4°49'W (B. Portier *in litt.*). Ovambo Sparrowhawk is an uncommon dry season visitor to the savanna zone, recorded in neighbouring countries (B&D, Salewski 2000), and to be expected in southern Burkina Faso.

***A. melanoleucus* Black Sparrowhawk.** One was photographed at Le Copalier campsite on 10 Feb 2010 (Fig. 2 left). This is a true forest species (B&D) recorded only much further south in Ghana and Ivory Coast.

***Phalaropus fulicarius* Red Phalarope.** One was photographed and observed with a 40x telescope, while swimming in the centre of Moussodougou Lake, on 16 Feb 2010. Its small size was appreciated by comparison with nearby White-faced Whistling Ducks. We noted the plain grey mantle and the white breast with a darker mark at the



Figure 1. Ovambo Sparrowhawk *Accipiter ovaupensis*, Le Copalier campsite.



Figure 2. Black Sparrowhawk *Accipiter melanoleucos*, (left), and young Buff-spotted Woodpecker *Campethera nivosa*, both at Le Copalier campsite.

base of the hindneck, the small dark mask, and dark hindcrown and bill. The length of the bill and overall shape and behaviour excluded first-winter Little Gull *Hydrocoloeus minutus*, the only other bird with a similar colour pattern. Usually pelagic or coastal in the non-breeding season, the Red Phalarope is sometimes

recorded inland along migration routes. It is commonly reported in the Atlantic Ocean off West Africa but rarely in the Gulf of Guinea, and only as an accidental in continental West Africa (B&D).

***Agapornis pullarius* Red-headed Lovebird.** Two were seen, and identified also by call by G. Vaschetti (pers. comm.), at Folonzo on 28 Nov 2003. A pair was observed extensively, from < 10 m, on trees close to Folonzo village on 21 Mar 2011; we observed all the characteristics of the species, in particular the small size and short tail, green body with red face (brighter in one individual than the other), and dark eyes. The closest breeding range is in the north of Ivory Coast and Ghana (B&D) but there are four reports from along the Niger and Mekrou rivers in Niger, which have been accepted by the Niger records committee (Brouwer 2001, J. Brouwer pers. comm.), and the habitat of the Folonzo area is suitable for the species. It is unlikely that the Folonzo birds were escaped from captivity, given the long time between our two observations and the remoteness of the village of Folonzo from possible trade routes.

***Caprimulgus nigriscapularis* Black-shouldered Nightjar.** A singing male (one of 2–3 singers) was sound-recorded at Le Copalier campsite on 17 Mar 2011 (Xenocanto XC 74873), representing a great range extension from the closest known areas in southwest Mali (Dowsett & Dowset Lemaire 2011), eastern Ivory Coast and southern Nigeria.

***Campethera nивosa* Buff-spotted Woodpecker.** A recently-fledged individual mist-netted in gallery forest close to Le Copalier campsite, 17 Mar 2011 (Fig. 2 right). Even though it was a young bird, we are confident of the identification as we compared it with many pictures and some specimens in the Natural History Museum of Torino, where specimens of other *Campethera* woodpeckers were also studied. Its known range is far to the south, in the Guinea-Congo forest block, but with a single small area in southern Mali. It is also reported from the nearby Comoé National Park, Ivory Coast (Salewski 2000). Our record demonstrates breeding of the species in the forest of southern Burkina Faso. Strangely, no other woodpecker species was seen clearly during our surveys.

***Locustella naevia* Grasshopper Warbler.** A single individual was mist-netted at Lemorodougou Lake (Fig. 3 top) on 13 Feb 2010. The closest known wintering areas of this Palaearctic migrant are in Ghana and Mali, along the Niger River (B&D, Kennerley & Pearson 2010).

***Acrocephalus baeticatus* African Reed Warbler.** Quite common in the reedbeds of Lemorodougou Lake, where several individuals were mist-netted and photographed (Fig. 3 bottom), and others observed. We identified reed warblers using plumage and measurements, according to Kennerley & Pearson (2010). To confirm the identification we sequenced the barcoding region of the cytochrome oxidase I gene using the procedures and primers detailed in Johnsen *et al.* (2010), and compared the sequences with those available on the Barcoding of Life Database <www.boldsystem.org>. Out of 16 *Acrocephalus* individuals whose DNA was

sequenced, 11 were this species while five were *A. scirpaceus* (D. Zuccon, pers. comm.). The West African distribution of the African Reed Warbler is fragmentary, probably due to a lack of information other than from coastal sites in Senegal and along the Niger River (B&D, Kennerley & Pearson 2010).



Figure 3. Grasshopper Warbler *Locustella naevia*, (top) and African Reed Warbler *Acrocephalus baeticatus*, both at Lemorodougou Lake.

***Lanius gubernator* Emin's Shrike.** A single male seen and photographed in wooded savanna close to Le Copalier campsite, 20 Mar 2011 (Fig. 4 left). Patchily distributed in Africa (Sinclair & Ryan 2010) but to be expected in Burkina Faso, as it is reported from Ghana (B&D), northern Benin (Dowsett & Dowsett-Lemaire 2011), and as a probable breeder in nearby Comoé National Park, Ivory Coast (Salewski 2000).

Laniarius aethiopicus **Tropical Boubou**. A single individual mist-netted at Le Copalier campsite, 10 Feb 2010 (Fig. 4 right). Known from nearby in the Ivory Coast (B&D, Salewski 2000).



Figure 4. Emin's Shrike *Lanius gubernator* (left) and Tropical Boubou *Laniarius aethiopicus*, both at Le Copalier campsite.



Figure 5. Shining Blue Kingfisher *Alcedo quadribrachys*, Le Copalier campsite (left) and Short-winged Cisticola *Cisticola brachypterus*, Folonzo.

Other noteworthy records

Among the other species recorded for the Cascade Region during our surveys, the following merit additional notes according to our knowledge of the current literature.

Ardeidae

Egretta intermedia Intermediate Egret. A few individuals were recorded and photographed at Lemorodougou and Tengrela Lakes, but 85 were seen at

Moussodougou Lake on 16 Feb 2010. This species is not otherwise reported in southwest Burkina Faso (B&D).

Anatidae

Dendrocygna viduata White-faced Whistling Duck. Regularly observed at Lemorodougou Lake in 2010 with flocks of *c.* 100. One flock of > 1500 was observed at Moussodougou Lake, and included 30 Spur-winged Geese.

Nettapus auritus African Pygmy Goose. Regularly observed at Lemorodougou Lake, with a maximum flock of 72 on 23 Mar 2011.

Falconidae

Falco tinnunculus Common Kestrel. Regularly observed in and around the city of Banfora and at the Pics de Sindou, where a breeding pair referable to the local subspecies *F. t. rufescens* was observed on 16 Feb 2010.

F. biarmicus Lanner. Commonly observed in many habitats. A pair with chicks occupied what was probably an old Pied Crow nest on a high-voltage tower close to Karfiguéla marsh, 22–23 Mar 2011.

Rallidae

Porphyrio alleni Allen's Gallinule. Quite common in Lemorodougou Lake, with juveniles seen and photographed. Present in most of Burkina Faso, but not in the southwest (B&D).

P. porphyrio Purple Swamphen. Single individuals were regularly seen and photographed at Lemorodougou Lake in 2010 and 2011. According to B&D this species is present only in the north of Burkina Faso.

Jacaniidae

Microparra capensis Lesser Jacana. Quite common in Lemorodougou and Tengrela Lakes, where many individuals were seen and photographed feeding on the floating vegetation in the centre of the lakes. Our observations confirm those of Lungren *et al.* (2001) and Portier *et al.* (2002). Reported by B&D only in the extreme southwest, close to the border with Ivory Coast.

Columbidae

Streptopelia decipiens African Morning Dove. Commonly seen and photographed in various localities of the Banfora area and at the Pics de Sindou. According to B&D the southwest of Burkina Faso is outside the distribution range of the species, which is typical of arid woodland.

Caprimulgidae

Macrodipteryx longipennis Standard-winged Nightjar. Quite common in the open wooded savannas of the Classified Forest of Comoé-Léraba, where 12 were mist-netted on 5–8 Feb 2010. A nest with two eggs was photographed near Le Copalier campsite on 19 Mar 2011 (E. Chaplain pers. comm.).

Coliidae

Urocolius macrourus Blue-naped Mousebird. Six individuals were seen near Banfora and five at Tengrela Lake, during the 2003 survey. Inhabits the north of Burkina Faso and the Sahel (B&D).

Alcedinidae

Halcyon malimbica Blue-breasted Kingfisher. Quite common at Le Copalier campsite, where four were mist-netted on 8–10 Feb 2010 and two 17–20 Mar 2011. Reported in the extreme south of Burkina Faso (B&D) as it is typical of riparian forests in wooded savannas.

Alcedo quadribrachys Shining Blue Kingfisher. One mist-netted at Le Copalier campsite, 9 Feb 2010 (Fig. 5 left). Previously known in Burkina Faso only from Arly National Park (Green & Sayer 1979). It inhabits streams of the Guineo-Congolian forests (B&D).

Hirundinidae

Hirundo daurica Red-rumped Swallow. A roost-like concentration of several hundred, with a few Barn Swallows and Wire-tailed Swallows, was observed in the Karfiguéla marsh on 22–23 Mar 2011. Photographs indicate the presence of the Senegambia–Chad *H. d. domicella* and of Palaearctic *H. d. rufula*.

H. aethiopica Ethiopian Swallow. One was mist-netted at Le Copalier campsite, 6 Feb 2010. Distributed only in the extreme north of Burkina Faso (B&D), but expected in the region as it inhabits the Ivory Coast quite close to the border.

Turdidae

Myrmecocichla cinnamomeiventris Cliff Chat. A few were photographed in the Pics de Sindou area, a suitable habitat for the species, on 16 Feb 2010. As stated by Connor (2010), who saw this species at the Karfiguéla falls, this suggests a wide distribution of this species in southwest Burkina Faso where there is suitable habitat. Patchy in West Africa, as it is associated with rocky areas in savannas. In Burkina Faso, only otherwise reported in the W National Park area (Green & Sayer 1979), while the nearest occurrence is in the northern Ivory Coast (B&D).

Sylviidae

Cisticola aberrans Rock-loving Cisticola. One photographed at Pic de Sindou, 16 Feb 2010. Inhabits rocky outcrops in the savanna and otherwise only known in the east of Burkina Faso, in particular in the W National Park area (B&D).

C. galactotes Winding Cisticola. Quite common in low vegetation around Lemorodougou Lake, where 12 were mist-netted in 2010 and 2011; also seen at Karfiguéla falls, 17 Feb 2010. Otherwise reported only in the extreme south and the centre of Burkina Faso along the White Volta River (B&D).

C. brachypterus Short-winged Cisticola. One photographed in wooded savannah close to Folonzo, 7 Feb 2010 (Fig. 5 right); another photographed at the Galerie à Roussettes, 16 Feb 2010; three mist-netted at Lemorodougou Lake, 12–13 Mar 2011. Not included in PNUE but widely reported for south Burkina Faso (B&D), based on as yet unpublished records, *e.g.* not uncommon in Nazinga Game Ranch (B. Portier and F. Dowsett-Lemaire *in litt.*).

C. juncidis Zitting Cisticola. One observed close to the Karfiguéla falls on 1 Dec 2003, and one photographed at Lemorodougou Lake on 12 Feb 2010. Patchy in West Africa, with a few populations in central and western Burkina Faso (B&D).

Hyltiota flavigaster Yellow-bellied Hyltiota. Two observed in wooded savanna around Folonzo, 28–29 Nov 2003. Not included in PNUE, but reported with a wide distribution in Burkina Faso by B&D, based on as yet unpublished records (B. Portier and F. Dowsett-Lemaire *in litt.*).

Muscicapidae

Muscicapa aquatica Swamp Flycatcher. One photographed at the Galerie à Roussettes, 16 Feb 2010; three mist-netted at Le Copalier campsite, 17 and 19 Mar 2011. Otherwise reported only in the extreme east of the country, in particular in the W National Park (Green & Sayer 1979, B&D). More recently, Connor (2010) reported one near Ouagadougou and other observations in southern Burkina Faso, and B. Portier (*in litt.*) found it at Nazinga Game Ranch and Kaboré Tambi National Park. These data suggest a wider distribution in this part of the country.

Myioparus plumbeus Lead-coloured Flycatcher. One seen on the Comoé river bank east of Folonzo, 29 Nov 2003; one mist-netted at Le Copalier campsite, 17 Mar 2011. Otherwise only reported in the east, close to the Benin border (B&D).

Platysteiridae

Platysteira cyanea Common Wattle-eye. Commonly observed at the Karfiguéla falls and Le Copalier campsite, where five were mist-netted. Otherwise only in the east (B&D), despite its presence in the north of southern neighbouring countries.

Sturnidae

Onychognathus neumanni Neumann's Starling. A pair photographed at Karfiguéla falls, 15 Feb 2010. Included in PNUE as *O. morio*. Patchy in West Africa, including extreme southwest Burkina Faso, southeast Mali and northern Ivory Coast (B&D). Associated with rocky outcrops but not reported at Karfiguéla by Connor (2010), suggesting that it is probably not common, even in suitable habitat.

Ploceidae

Ploceus nigricollis Black-necked Weaver. Fairly common in the wooded area at Karfiguéla falls, where six mist-netted on 16 Feb 2010. Also observed at Kou forest, 15 Mar 2011. Known only in the southwest (B&D), but our observations close to Banfora and Bobo-Dioulasso extend the known range.

Quelea quelea Red billed Quelea. Numerous flocks of tens up to 150, together with *Enplectes* weavers at a roost in the reed beds of Lemorodougou Lake in 2010 and 2011. According to B&D, only distributed in the centre and north of Burkina Faso.

Enplectes afer Yellow-crowned Bishop. Single individuals seen and mist-netted at Lemorodougou Lake and Karfiguéla marsh. Patchy in West Africa (B&D), particularly along the Niger valley and in the centre and north of Burkina Faso. In the south, only reported in a small area close to the Mali border (B&D).

Emberizidae

Emberiza tahapisi Cinnamon-breasted Rock Bunting. A breeding pair of the subspecies *E. t. goslingi*, with the female carrying food, was photographed at the Pics de Sindou, 16 Feb 2010.

Discussion

We documented ten bird species new for Burkina Faso and new localities for a number of others. Considering the shortness of the surveys, limited to the dry season, these results indicate that there is still much to be learned about the distribution of birds in the Cascades Region. In particular, surveys in the wet season are recommended in order to acquire a more complete knowledge of the bird fauna. We did not record certain species reported as common in nearby Comoé National Park by Salewski (2000), such as some woodpeckers, warblers and starlings. In some cases this was probably due to our lack of familiarity with some vocalisations.

Overall our observations indicate that in southwest Burkina Faso, beside the typical Sudanian zone bird fauna, some elements of the Guineo-Congolian avifauna can occasionally be observed or may even be present as small breeding or migratory populations.

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Appendix 1.

Species observed during the three surveys. Locality codes are explained in Table 1. Taxa documented by a photograph or specimen are marked with an asterisk. “Water & fields” includes rivers, lakes and surrounding cultivation.

	Observed		No. mist-netted			Towns, gardens	Wooded savanna	Rocky areas	Water & fields
	2003	2010	2011	2003	2010	2011			
Phalacrocoracidae									
<i>Phalacrocorax africanus</i>	x	x	x						K,L,M,T
Ardeidae									
<i>Ixobrychus minutus</i>		x			1				L
<i>Ardeola ralloides</i>	x	x	x						L,N,T
<i>Bubulcus ibis</i>	x	x	x				C,F	K,S	L,M,N,R,T
<i>Butorides striata</i>	x	x					F	K	T
<i>Egretta garzetta</i>	x	x	x						L,M,N
<i>E. intermedia</i>		x	x						L,M,T
<i>E. alba</i>		x	x						L,M,T
<i>Ardea purpurea</i>	x	x	x						L,N,R,T
<i>A. cinerea</i>	x	x	x				F		L,M
<i>A. melanocephala</i>		x	x						L
Scopidae									
<i>Scopus umbretta</i>	x		x				C,F	K	L,M,N
Ciconiidae									
<i>Ciconia episcopus</i>		x	x				C,F		
Threskiornithidae									
<i>Bostrychia hagedash</i>	x						F		
Anatidae									
<i>Dendrocygna viduata</i>		x							L,M,N
<i>Plectropterus gambensis</i>		x	x						L,M,N

	Observed		No. mist-netted		Towns, Wooded	Rocky	Water &
	2010	2011	2003	2010	gardens savanna	areas	fields
<i>Sarkidiornis melanotos</i> Knob-billed Duck*	X						M
<i>Nettapus auritus</i> African Pygmy-goose*	X	X					L
Accipitridae							
<i>Elanus caeruleus</i> Black-shouldered Kite*	X	X	X		B	K	T,L,N
<i>Milvus migrans</i> Black Kite*		X	X				L
<i>M. m. parasitus</i> Yellow-billed Kite*	X	X	X		B	K,S	L,M,N,R,T
<i>Necrosyrtes monachus</i> Hooded Vulture*	X	X	X		B	K,S	N
<i>Gyps africanus</i> African White-backed Vulture*	X	X	X		B		
<i>G. rueppellii</i> Rüppell's Griffon Vulture*	X	X	X				
<i>Circus cinerascens</i> Western Banded Snake Eagle*	X						
<i>Terathopius ecaudatus</i> Bateleur*	X	X	X				
<i>Polyboroides typus</i> African HarrierHawk*	X	X	X			K,S	N
<i>Circus aeruginosus</i> Eurasian Marsh-Harrier*	X	X	X		B	K	L,M,N,R,T
<i>Melierax metabates</i> Dark Chanting Goshawk*	X	X			B		L,M
<i>Accipiter badius</i> Shikra*	X	X	1		B	K	L,N
<i>A. ovampensis</i> Ovambo Sparrowhawk*	X	X		1		K	
<i>A. melanoleucus</i> Black Sparrowhawk*		X					
<i>Butastur rufipennis</i> Grasshopper Buzzard*	X	X	X			K	L,M,R
<i>Kaupifalco monogrammicus</i> Lizard Buzzard*	X	X	1	1		K	N,T
<i>Buteo auguralis</i> Red-necked Buzzard*	X	X	X				
<i>Aquila rapax</i> Tawny Eagle*	X	X				K	
<i>A. wahlbergi</i> Wahlberg's Eagle*		X	X			K	
Falconidae							
<i>Falco tinnunculus</i> Common Kestrel*	X	X	X		B	S	
<i>F. alopec</i> Fox Kestrel*		X				S	
<i>F. ardosiaceus</i> Grey Kestrel*	X	X	X			K	L,M,N

	Observed		No. mist-netted			Towns, gardens	Wooded savanna	Rocky areas	Water & fields
	2003	2010	2011	2003	2010	2011			
Scolopacidae									
<i>Philomachus pugnax</i> Ruff		x							M
<i>Gallinago gallinago</i> Common Snipe		x	x						L
<i>Tringa nebularia</i> Common Greenshank		x							L,M
<i>T. ochropus</i> Green Sandpiper		x					F		L,M
<i>T. glareola</i> Wood Sandpiper		x							L
<i>Actitis hypoleucos</i> Common Sandpiper*	x	x	x				C,F	K	M
<i>Phalaropus fulicarius</i> Red Phalarope*		x							M
Pteroclididae									
<i>Pterocles quadricinctus</i> Four-banded Sandgrouse*	x	x	x		4	B	F,C		L
Columbidae									
<i>Treron calva</i> African Green-Pigeon*	x	x	x				F	K,S	
<i>T. waalia</i> Bruce's Green-Pigeon*		x	x				D,F	K,S	
<i>Turtur afer</i> Blue-spotted Wood Dove*	x	x	x		1	6	C,F	K,S	
<i>T. abyssinicus</i> Black-billed Wood Dove*	x	x	x	2	5	1	F	K,S	L,N,R
<i>Oena capensis</i> Namaqua Dove	x	x					F		
<i>Columba guinea</i> Speckled Pigeon*		x	x			B		S	N
<i>C. livia</i> var. <i>domestica</i> Feral Pigeon		x	x			B			
<i>Streptopelia senitorquata</i> Red-eyed Dove*		x	x			B	C,F	K,S	L,N,R,T
<i>S. decipiens</i> African Mourning Dove*		x	x			B		K,S	L,N,T
<i>S. vinacea</i> Vinaceous Dove*	x	x	x	12	3	B	C,D,F		L,N,R,T
<i>S. turtur</i> European Turtle Dove*	x	x					F		T
<i>S. senegalensis</i> Laughing Dove*	x	x	x			B	D,F	K,S	
Psittacidae									
<i>Poicephalus senegalus</i> Senegal Parrot*	x	x	x			B	C,F	K,S	L
<i>Agapornis pullarius</i> Red-headed Lovebird	x		x				F		

<i>Psittacula krameri</i>	Rose-ringed Parakeet	X	X	X	B	F	K	L,N,T
Musophagidae								
<i>Musoplagia violacea</i>	Violet Turaco*		X	X		D,F	K,S	M,N,R,T
<i>Crinifer piscator</i>	Western Grey Plantain-eater*	X	X	X	B	F	K,S	L,M,N,R,T
Cuculidae								
<i>Chrysococcyx klaas</i>	Klaas's Cuckoo			X				N
<i>Centropus senegalensis</i>	Senegal Coucal*	X	X	X	B	D,F	K,S	L,N,R,T
Tytonidae								
<i>Tyto alba</i>	Barn Owl*		X	X	B		S	L
Strigidae								
<i>Otus senegalensis</i>	African Scops-Owl*			X		C,F		
<i>Bubo cinerascens</i>	Greyish Eagle-Owl*	X	X		2	C,F		
<i>Glauclidium perlatum</i>	Pearl-spotted Owlet		X			C		
Caprimulgidae								
<i>Caprimulgus climacurus</i>	Long-tailed Nightjar*		X	X	1	C,F		L
<i>C. nigriscapularis</i>	Black-shouldered Nightjar*			X		C		
<i>Macrodipteryx longipennis</i>	Standard-winged Nightjar*		X	X	12	C		N
Apodidae								
<i>Telacanthura nssheri</i>	Mottled Spinetail		X	X		C,F		
<i>Cypsinurus parvus</i>	African Palm-Swift*	X	X	X	B	D,F	K	L,N,T
<i>Apus caffer</i>	White-rumped Swift		X		B	F		
<i>A. affinis</i>	Little Swift*	X	X	X	B	F		L,N
Coliidae								
<i>Urocolinus macrourus</i>	Blue-naped Mousebird	X			B			T
Alcedinidae								
<i>Halcyon leucocephala</i>	Grey-headed Kingfisher*	X	X	X	1	C		
<i>H. malimbica</i>	Blue-breasted Kingfisher*	X	X	X	4	C		
<i>Ceyx pictus</i>	African Pygmy Kingfisher*		X	X	5	C,D	K	L

<i>L. dubius</i> Bearded Barbet*	X	X	X		B	D,F	L,N,R
Indicatoridae							
<i>Indicator indicator</i> Greater Honeyguide*		X	X	1		F,C	N
Picidae							
<i>Campethera nivosa</i> Buff-spotted Woodpecker*					1	C	
Alaudidae							
<i>Galerida modesta</i> Sun Lark*	X	X					T
Hirundinidae							
<i>Riparia riparia</i> Sand Martin		X	X		F	F	L,N
<i>Hirundo daurica donicella</i> Red-rumped Swallow*			X				N
<i>H. d. rufula</i> Red-rumped Swallow*			X				N
<i>H. prenssi</i> Preuss's Cliff Swallow*			X				N
<i>H. smithii</i> Wire-tailed Swallow*	X	X	X	2		C,F	L,N
<i>H. aethiopica</i> Ethiopian Swallow*		X		1		C	
<i>H. lucida</i> Red-chested Swallow	X	X			B		L,M,R,T
<i>H. rustica</i> Barn Swallow*		X	X				L,N,R
<i>Delichon urbica</i> Northern House Martin	X	X	X			F	L, N
Motacillidae							
<i>Motacilla flava flava</i> Yellow Wagtail*		X	X				L,N
<i>Anthus leucophrys</i> Plain-backed Pipit*		X					M
<i>A. trivialis</i> Tree Pipit*	X	X	X	2		C,F	
<i>Macronyx croceus</i> Yellow-throated Longclaw*		X	X	1			L,N
Pycnonotidae							
<i>Pycnonotus barbatus</i> Common Bulbul*	X	X	X	5	2	8	K,S
						C,D,F	L,N,R,T
Turdidae							
<i>Cossypha niveicapilla</i> Snowy-crowned Robin-Chat*		X	X		5	4	B
<i>C. albicapilla</i> White-crowned Robin-Chat*	X	X	X	1	4	1	N
<i>Saxicola rubetra</i> Whinchat*	X		X			F	L

	Observed		No. mist-netted			Towns, Wooded	Rocky	Water &
	2003	2010	2011	2003	2010	2011	areas	fields
<i>Myrmecocichla albifrons</i> White-fronted Black Chat	x							
<i>M. cinnamomeiventris</i> Cliff Chat*		x					S	
<i>Turdus pelios</i> African Thrush*	x	x	x	13	3		C,F	N,R,T
Sylviidae								
<i>Melocichla mentalis</i> African Moustached Warbler*	x	x	x			2	C	L
<i>Locustella naevia</i> Grasshopper Warbler*	x				1			L
<i>Acrocephalus schoenobaenus</i> Sedge Warbler*	x	x	x		2	6		L
<i>A. scirpaceus</i> European Reed Warbler*	x		x	1		5	F	L
<i>A. baeticatus</i> African Reed Warbler*		x	x		4	7		L
<i>A. arundinaceus</i> Great Reed Warbler*	x	x	x		2			L
<i>Hippolais pallida/opaca</i> Olivaceous Warbler	x						B	
<i>H. polyglotta</i> Melodious Warbler*		x						N
<i>Cisticola erythrops</i> Red faced Cisticola*		x	x			1	C	
<i>C. aberrans</i> Rock-loving Cisticola*	x						S	
<i>C. galactotes</i> Winding Cisticola*	x	x	x		6	6		L
<i>C. brachypterus</i> Short-winged Cisticola*		x	x			3	F	L,R
<i>C. juncidis</i> Zitting Cisticola*	x	x					K	L
<i>Prinia subflava</i> Tawny-flanked Prinia*		x	x				D	L
<i>Camaroptera brachyura</i> Grey-backed Camaroptera	x	x	x	3	3	6	C,F	T
<i>Eremomela pusilla</i> Senegal Eremomela	x	x					C	
<i>Sylvietta brachyura</i> Northern Crombec*			x			1	C	L
<i>Phylloscopus trochilus</i> Willow warbler*			x			1		
<i>Hyliota flavigaster</i> Yellow-bellied Hyliota	x						F	
Muscicapidae								
<i>Melaenornis edolioides</i> Northern Black-Flycatcher	x	x	x	2	1	2	C,D,F	N
<i>M. pallidus</i> Pale Flycatcher*			x			1	C	

<i>Muscicapra aquatica</i>	Swamp Flycatcher*	X	X	3	C	R
<i>Myioparus plumbeus</i>	Lead-coloured Flycatcher*	X		1	C,F	
<i>Ficedula hypoleuca</i>	Pied Flycatcher*	X	X	1	C,F	K
Monarchidae						
<i>Eiminia longicauda</i>	African Blue Flycatcher*	X		3	B	K
<i>Terpsiphone viridis</i>	African Paradise Flycatcher*	X	X	5	C,D,F	K,S
Platysteiridae						
<i>Platysteira cyanea</i>	Common Wattle-eye*	X	X	1	C,D	K
<i>Batis senegalensis</i>	Senegal Batis*	X	X	3	C,F	N
Timaliidae						
<i>Turdoides plebejus</i>	Brown Babbler*	X		4		K
<i>T. reinwardii</i>	Blackcap Babbler*	X	X	8	C,F	K
Nectariniidae						
<i>Anthreptes gabonicus</i>	Brown Sunbird*	X		1	C	
<i>Cyanomitra verticalis</i>	Green-headed Sunbird*	X	X	1	C	K
<i>Chalcomitra senegalensis</i>	Scarlet-chested Sunbird*	X	X	2	F,C	K
<i>Hedypina platura</i>	Pygmy Sunbird	X	X		F,C	S
<i>Cimyrus pulchellus</i>	Beautiful Sunbird*	X	X	4	B	
<i>C. coccinigaster</i>	Splendid Sunbird*	X	X	2	C	
Laniidae						
<i>Lanius gubernator</i>	Emin's Shrike*	X			C	
<i>L. senator</i>	Woodchat Shrike*	X				L
<i>Corvinella corvina</i>	Yellow-billed Shrike*	X	X	1	D,F	K
Malaconotidae						
<i>Tchagra senegala</i>	Black-crowned Tchagra*	X	X	1	F	N
<i>Dryoscopus gambensis</i>	Northern Puffback*	X	X		C,D	K
<i>Laniarius aethiopicus</i>	Tropical Boubou*	X		1	C	
<i>L. barbarus</i>	Yellow-crowned Gonolek*	X	X	6	C,D	K,S

	Observed		No. mist-netted			Towns, gardens	Wooded savanna	Rocky areas	Water & fields
	2003	2010	2011	2003	2010	2011			
Prionopidae									
<i>Prionops plumatus</i> White Helmet-shrike*	x						F		
Oriolidae									
<i>Oriolus auratus</i> African Golden Oriole	x	x	x				C	K	
<i>O. oriolus</i> Eurasian Golden Oriole		x					F,C		
Dicruridae									
<i>Dicrurus ludwigii</i> Square-tailed Drongo*	x	x	x			1	C,F	K	
<i>D. adsinilis</i> Fork-tailed Drongo*	x	x	x			1	C,F	S	N,T
Corvidae									
<i>Corvus albus</i> Pied Crow*	x	x	x				F	S	L,M,N,T
<i>Ptilostomus afer</i> Piapiac*	x	x	x					K	L,N,R,T
Sturnidae									
<i>Onychognathus neumanni</i> Neumann's Starling*		x						K	
<i>Lauroprotonis purpureus</i> Purple Glossy Starling*	x	x	x				F	K	L,N
<i>L. chalcurus</i> Bronze-tailed Glossy Starling*		x						K	
<i>L. caudatus</i> Long-tailed Glossy Starling*	x	x	x			B		K	L,N,R,T
<i>L. pulcher</i> Chestnut-bellied Starling*		x	x			B			L
<i>Cinnyricinclus leucogaster</i> Violet-backed Starling*		x	x				C	K	
Buphagidae									
<i>Buphagus africanus</i> Yellow-billed Oxpecker*	x	x					F		T
Passeridae									
<i>Passer griseus</i> Northern Grey-headed Sparrow*	x		x	5		1	C		
<i>Petronia dentata</i> Bush Petronia*		x	x		4	3	C,F	K	R
Ploceidae									
<i>Ploceus nigricollis</i> Black-necked Weaver*		x	x		6		D	K	
<i>P. heuglini</i> Heuglin's Masked Weaver		x						K	

Aspects of the breeding biology of Abdim's Stork *Ciconia abdimii* in Nigeria

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Summary

Breeding distribution, arrival dates, nesting tree preferences, incubation and fledging periods, and clutch and brood sizes of Abdim's Stork *Ciconia abdimii* in Nigeria are described based on data collected during a study from 28 April to 19 August 2010. Earliest laying dates were at the end of March to early April, with fledging dates from mid- to late July. Nesting materials, average clutch size (2.7 ± 0.11 eggs, $n = 57$ nests) and brood size (2.47 ± 0.07 chicks, $n = 76$ nests) of this population were similar to those of other populations studied in West Africa. A population of at least 538 birds was estimated for the 77 villages searched in Adamawa, Bauchi and Kano States, of which Abdim's Storks were found nesting in 53 villages. All nests in the areas searched were in villages. Baobabs *Adansonia digitata* appear to be a preferred nest-tree species out of 12 tree species used for nesting.

Résumé

Aspects de la biologie de la reproduction de la Cigogne d'Abdim *Ciconia abdimii* au Nigeria. Les zones de reproduction, les dates d'arrivée, les arbres préférés pour la nidification, les périodes de couvaison et des premiers envols, ainsi que le nombre d'œufs et de poussins de la Cigogne d'Abdim au Nigeria sont décrits sur la base de données collectées au cours d'une étude effectuée du 28 avril au 19 août 2010. Les dates des premières pontes se situaient de fin mars à début avril, avec les premiers envols de poussins de mi-juillet à fin juillet. Les matériaux pour la construction du nid, la taille moyenne de la

nichée (2.7 ± 0.11 œufs, $n = 57$ nids) et le nombre moyen de poussins (2.47 ± 0.07 poussins, $n = 76$ nids) de cette population étaient similaires à ceux d'autres populations étudiées en Afrique de l'Ouest. Une population d'au moins 538 oiseaux a été estimée pour les 77 villages étudiés dans les Etats de l'Adamawa, Bauchi et Kano, parmi lesquels des Cigognes d'Abdim ont été observées nichant dans 53 villages. Tous les nids des zones étudiées se trouvaient dans des villages. Le Baobab *Adansonia digitata* paraît être l'arbre préféré de nidification, parmi 12 espèces d'arbres utilisés.

Introduction

Abdim's Stork *Ciconia abdimii* is an intra-African trans-equatorial migrant, breeding during rainy seasons in many human settlements across the Sahel (Brown *et al.* 1982). It arrives on its West African breeding grounds between March and April, breeds between May and August, then moves south at the onset of the dry season (Brown *et al.* 1982, Borrow & Demey 2004). Its arthropod prey also becomes abundant with the rains (del Hoyo *et al.* 1992), which makes it a potentially suitable species to investigate seasonal changes in behaviour and possible effects of the changing climate on this behaviour. Its migratory strategy has led African tribesmen to use it as an indicator of rainfall, where it is welcomed as the "harbinger of rains" (Brown *et al.* 1982). In northern Nigeria, where the species is a common breeding visitor, local farmers have planned their agricultural calendars according to its seasonal movements (Ezealor 2002). Despite its importance to African people and the opportunities it presents for climatic studies, data on its population size and general behaviour are still limited in West Africa and especially in Nigeria. In West Africa, study of the species has been carried out in Benin (Adjakpa 2000) and Niger (Christensen *et al.* 2008, Petersen *et al.* 2008).

The A.P Leventis Ornithological Research Institute (APLORI) has attempted the first large scale distributional survey of this species in northern Nigeria, as the start of a long-term study to understand the effect of the changing climate on its ecology. This article presents findings from the survey, which was carried out from 28 Apr to 19 Aug 2010.

Methods

Surveys were carried out in seven states in northern Nigeria: Adamawa, Bauchi, Gombe, Kano, Sokoto, Taraba and Zamfara States (Fig. 1). These states, mostly within the Sahel and Sudan savannah ecological zones, occur between 9° and 13° N and 4° and 13° E. Mean annual rainfall in the region ranges between 400 and 1000 mm during the wet season (May–Sep) with heaviest rainfall in August. Temperature ranges from 12 to 36° C in the dry season and 18 – 43° C in the rainy season.



Figure 1. Map of Nigeria showing states visited during the survey. Stars = extensive survey in at least one Local Government Area; dots = casual surveys.

Extensive surveys were carried out in one Local Government Area (LGA) in each of Adamawa, Bauchi and Kano States, including: three survey visits to Alkaleri LGA in Bauchi State from 29 Apr to 2 May, 26–29 May and 29 Jun to 6 Jul 2010; two survey visits to Fufore LGA, Adamawa State, 19–21 Jul and 16–19 Aug 2010; one survey visit to Rano LGA in Kano State on 9–10 Jun 2010. On the first survey visit to these states, a systematic search of villages was carried out by driving along major routes in the area. We stopped at every village along the route to record numbers of Abdim’s Storks and nests, nest contents and characteristics of nesting trees. Geographical coordinates of all trees where Abdim’s Storks’ nests were seen were taken with a Garmin 60 GPS so that nests could be re-located in areas where more than one survey visit was made, *i.e.* Adamawa and Bauchi States. Casual surveys (without stops to observe nests) were done in Gombe, Sokoto, Taraba and Zamfara States during this phase of the project. We also looked for nests outside villages as we drove between them, and although we did not search woodlands between villages,

we believe that we would have detected some nests outside villages had there been many.

All trees where Abdim's Stork nests were seen were identified to species. They were climbed with a ladder and the nests were observed for general structure, nesting materials and contents. Frequency of use of such tree species for nesting, tree height, and diameter at breast height (DBH) estimated by eye to the nearest 1 metre were recorded. Permission was sought from the village head in order to climb any trees.

The number of home clusters in each village was estimated in order to group villages into settlement size categories and hence investigate the relationships between settlement size and number of birds and nests. Villages were classed as small (1–30 houses) and large (> 30 houses). Whether the tree was fenced in within a home or not was also recorded, to assess birds' preferences for nesting on trees within home settlements and if this provided protection. We assessed local knowledge and beliefs about the species via unstructured interviews with local people.

The breeding population was estimated from the number of nests counted, where each active nest represents a breeding pair. Information on breeding phenology was estimated by comparing our observations of breeding Abdim's Storks in Bauchi State on the three visits there, with breeding observations reported by Bigalke (1974 *in* Brown *et al.* 1982) and Adjakpa (2000). Mean clutch size was calculated from clutch sizes recorded during the survey period preceding first observation of chicks. Mean brood size was estimated from data collected on the subsequent visit. This is when the highest number of chicks was observed. A Mann-Whitney test was used to compare the average number of nests per tree in small and large villages and between trees that were fenced in or not. Means are given \pm S.E.

Results

Breeding phenology, clutch and brood size

A total of 188 nests was recorded from all villages visited in Bauchi State from 29 Apr to 2 May 2010. The contents of 88 (47 %) of these nests were recorded, of which 57 (65 %) contained 1–4 eggs (mean 2.7 ± 0.11). Eggs were mostly white, sometimes looking stained and with light brown spots. No chicks were found during this survey visit and the earliest possible date for the start of incubation in Bauchi State in 2010, calculated by subtracting a 28–30 day incubation period (Bigalke 1974, Adjakpa 2000) from the date of our earliest visit (29 Apr to 2 May), must therefore have been between the last week in March and the first week of April.

Our second survey, 26–29 May (27–30 days later), revealed that 80 % of the eggs had hatched and brood size was 2.47 ± 0.07 chicks ($n = 76$ nests). Based on the description in Brown *et al.* (1982) we estimate that the chicks were a few days to about two weeks old at the most (see Fig. 2 A-D). Assuming a 50–60 day fledging period (Brown *et al.* 1982) we therefore estimate fledging dates to be sometime between mid- and late July.



Figure 2. Abdim's Stork chicks observed in Bauchi State, Nigeria, 26–29 May 2010. A–B: chicks probably up to a couple of days old. C–D: more developed chicks, probably 7–15 days old.

The third survey visit to Bauchi State (29 Jun to 6 Jul, 30–36 days after the second visit) was earlier than the estimated fledging dates, and the chicks observed were more developed. We observed two failed flight attempts by chicks during this visit and, on both occasions, the chicks were picked up and returned to the nests. Flights that were more successful were observed during a later visit to breeding colonies in Adamawa State (19–21 Jul), when on sighting climbers some young birds made short flights from the nest to nearby trees and returned to their nests later. About 90 % of 80 nests were empty when we visited Adamawa State 16–19 Aug, and we assume that most of the chicks had fledged.

Breeding distribution and population size

Abdim's Storks were sighted in all the seven states visited during this survey (Fig. 1). In Adamawa, Bauchi and Kano States, of 77 villages searched, breeding was observed in 53 (69 %) in Fufere and Alkaleri LGAs (Adamawa and Bauchi States respectively), in none in Rano LGA (Kano State). In the 53 villages, 269 nests with breeding evidence were recorded. Taking each nest to represent a breeding pair, we estimate a

breeding population of at least 538 individuals for this area. However, we directly counted *c.* 412 birds as we drove through villages, including birds seen in flight, perched on trees, foraging or gathering nesting materials on the ground. The highest number of Abdim’s Storks seen at one time was a group of *c.* 86 soaring birds in Adamawa State. A group of *c.* 56 birds was also recorded in Bauchi State, where we estimated an average group size of 7.6 birds. We counted only four birds in the 12 villages surveyed in Rano LGA, where local reports suggest fewer Abdim’s Storks in this area than about 15 years ago.

Nesting tree characteristics and other nest observations

The 269 Abdim’s Stork nests observed were on a total of 144 trees belonging to 12 species. The average tree height and DBH irrespective of tree species were 19.5 ± 0.57 m and 1.1 ± 0.06 m respectively (Table 1). The most common tree for nesting was Baobab *Adansonia digitata* with 91 records (63 %), probably because it has large branches providing adequate support for the nests. The nests on other tree species mostly occurred in villages with few or no Baobab trees.

Table 1. Tree species used for nesting and their characteristics.

	N trees (% of total)	Mean height (m)	Mean DBH (m)
<i>Adansonia digitata</i>	91 (63)	18.1	1.3
<i>Azadirachta indica</i>	18 (12)	23.4	0.7
<i>Borassus aethiopum</i>	13 (9)	24.9	0.4
<i>Ficus</i> sp.	5 (3)	17.6	0.8
<i>Parkia clappertoniana</i>	4 (3)	19.3	0.7
<i>Prosopis africana</i>	3 (2)	11.3	-
<i>Tamarindus indica</i>	3 (2)	23.0	1.3
<i>Mangifera indica</i>	2 (1)	28.0	1.5
<i>Acacia albizioides</i>	1 (1)	12.0	0.3
<i>Gmelina arborea</i>	1 (1)	20.0	0.2
<i>Khaya senegalensis</i>	1 (1)	28.0	2.3
<i>Vitellaria paradoxa</i>	1 (1)	24.0	0.8
Unidentified dead tree	1 (1)	-	-

Nests were usually built with dry sticks and grasses (Fig. 3A). The twigs were piled together and usually supported in portions of the tree where many branches formed multi-forked and cupped hollows that provided good support for the nests (see Fig. 3A). A few birds were seen collecting twigs for nest repairs and building, and locals reported cases where such materials were taken from conspecifics or other species. In some villages, Abdim’s Stork nests were observed on trees where White-billed Buffalo Weaver *Bubalornis albirostris* nests also occurred. Locals reported that

Abdim's Storks take twigs from these nests when they breed and these materials are reclaimed by the Buffalo Weavers when they also return to breed. Other materials including pieces of clothes and rags, sacks, polythene bags and in one case, human hairs, were also observed to make up nesting materials (see Fig. 3 B–D).

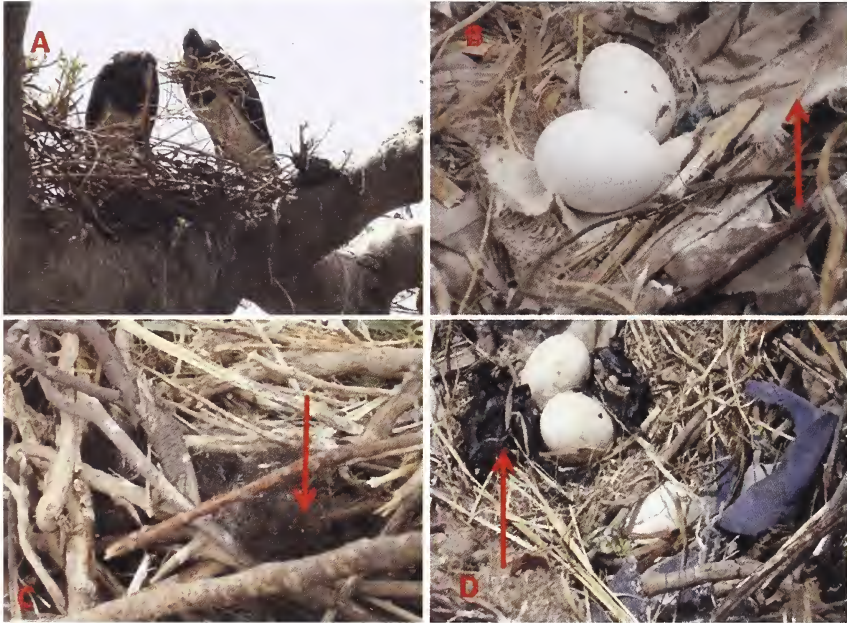


Figure 3. Nest building and nesting materials in Abdim's Storks in Nigeria. A: a breeding pair still building with dry twigs and grass. B: nest with rags. C: nest with hair. D: nest with PVC bag and rags.

Anthropogenic associations and possible threats

All colonies and trees with Abdim's Stork nest were recorded within villages and settlements or at the outskirts, and interviews with villagers indicated that birds were hardly ever found nesting outside villages. Out of the 33 villages where breeding activity was evident in Alkaleri, 23 were small settlements while another ten were large. Although on average there were more nests and birds per tree in larger settlements, these differences were not significant (Mann Whitney tests: $Z = -1.3$, $P = 0.21$ and $Z = -1.4$, $P = 0.15$ respectively). There was also no significant difference in the average number of nests per tree irrespective of whether trees were fenced in or not (Mann Whitney test: $Z = -0.6$, $P = 0.56$).

Residents of Duguri Village (Bauchi State) reported a case of unintentional poisoning of storks leading to mass mortality in the breeding season preceding our survey, after storks fed on insects in farmlands where pesticides had been used. Only a single breeding pair was recorded in this village where residents claimed > 20 pairs had bred in the previous year. In one village in Rano LGA, a pair that had consistently bred there was reportedly last seen about five years previously when one of the pair was shot. We also observed a wind storm destroy a nest in a village in Bauchi State although this nest was reconstructed on our next visit.

Discussion

Many of the breeding parameters of the population we studied were similar to those of other populations of the species. Nest materials observed by us are consistently reported for this species (Brown *et al.* 1982). Similar clutch sizes were reported by Brown *et al.* (1982) (1–3 eggs, mean 2.2, maximum 3, $n = 16$ nests), Adjakpa (2000) (1–5, mean 3.2) and Christensen *et al.* (2008) (1–4, mean 2.78, $n = 36$). Our estimated start date of incubation, late March to early April, is comparable with dates for populations in the far north of Benin (Adjakpa 2000), at about the same latitudes (*i.e.* 10–12°N), where rainfall pattern is similar. Populations in Niger however start incubation later, around early May (Christensen *et al.* 2008), probably because of their more northerly latitudes with the corresponding later start of rainfall.

The average size of groups of Abdim's Storks in Bauchi State (7.6) is lower than that of not less than ten birds reported previously (Brown *et al.* 1982, Hoyo *et al.* 1992). Foraging densities of *c.* 80–90 Abdim Storks per ha have also been estimated in Kano State (Amatobi *et al.* 1987).

Various factors, including habitat degradation for urban development, agricultural activities, overgrazing and reduced food availability due to pesticides might have caused population declines in this species. Given the agrarian nature of most surveyed villages, a possible decline due to pesticides deserves further investigation. Other threats reported by Adjakpa (2000) include hunting of birds for meat, egg removal, and destruction of nests and nesting trees during violent storms. These were observed and reported in some of the villages we surveyed. Although some of our results may appear to indicate a declining Abdim's Stork population, our survey is not sufficient or extensive enough to be sure. Abdim's Stork populations have not been well studied in Nigeria and we hope that as this project continues, more informed conclusions will be made about population status and dynamics of the species in Nigeria.

The association of this bird with humans was evident as all records of the birds were within human settlements, with more nests and birds recorded in the larger villages. The slightly higher number of nests observed on trees fenced within compounds rather than outside also seems to suggest that this association with humans may be of some benefit to the species.

The association between Abdim's Stork and Baobabs may be partly due to the fact that Baobabs are common, gregarious and widespread in the savannas of Nigeria, and are often planted and protected by people, so often associated with human settlements (Keay *et al.* 1960, Arbonnier 2004). They and the storks thus both enjoy some form of protection in this area. Also, the other nest-tree species often appeared freshly trimmed and the locals reported that such trees, especially Neem *Azadirachta indica*, were trimmed regularly, in most cases for firewood and fencing material. This is likely to disturb any bird that may be breeding or intending to breed in such trees and may reduce their attractiveness for the storks. The species is reported to reuse nests repeatedly (not necessarily by the same pair) and we hope to confirm nest fidelity from tagged storks in the next phase of this project.

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Contribution à l'étude de la biologie de reproduction du Martin-pêcheur huppé *Alcedo cristata*

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Résumé

De 2004 à 2009, 127 nids du Martin-pêcheur huppé *Alcedo cristata* ont été suivis dans la région de Kinshasa (République Démocratique du Congo), en vue du comptage des œufs, et du baguage des jeunes et adultes. Au total 195 Martins-pêcheurs huppés dont 57 adultes nicheurs et 138 poussins ont été bagués dont tous les adultes et 121 poussins ont été pesés et mesurés. Les résultats obtenus montrent que le Martin-pêcheur huppé pond 2–4 œufs qu'il incube 15–16 jours. La durée d'élevage des poussins est de 16 à 17 jours. Les exigences liées au métabolisme et à l'écologie chez les jeunes peuvent expliquer le patron de croissance des poussins.

Summary

Contribution to the breeding biology of the Malachite Kingfisher *Alcedo cristata*. From 2004 to 2009, 127 nests of the Malachite Kingfisher *Alcedo cristata* were monitored in the Kinshasa region (Democratic Republic of Congo) by counting eggs and ringing chicks and adults. In total, 195 birds (57 adults and 138 fledglings) were ringed, of which all adults and 121 chicks were weighed and measured. The Malachite Kingfisher lays 2–4 eggs that are incubated 15–16 days in the burrow. The nestling period is 16–17 days. Chick metabolic and ecological demands may explain the pattern of growth of the nestlings.

Introduction

Aucune étude d'envergure n'a été envisagée pour comprendre le patron de croissance des poussins du Martin-pêcheur huppé *Alcedo cristata*. Quelques informations fragmentaires

voire anecdotiques sur cette espèce afrotropicale portent sur son régime alimentaire (Douthwaite 1976, Fry *et al.* 1992, Libois & Laudelout 2004), y compris celui des poussins (Kisasa Kafutshi 2012a, 2012b). Chez les oiseaux nidicoles, la maturation des fonctions physiologiques, la chronologie et le mode de croissance des différents organes répondent à une pression sélective et leur croissance est susceptible de mettre en évidence des paramètres plus ou moins importants pour la survie de l'oiseau (Hallet-Libois 1985). Dans la présente étude, j'ai initié de fines observations sur la croissance et le développement des poussins afin de cerner les besoins de la nichée et d'expliquer le patron de consommation de l'espèce en période de la reproduction.

Méthodes

Kinshasa, capitale de la République Démocratique du Congo, est comprise entre 4° et 5°S, 15° et 16°30'E. Presque trois quarts du territoire de sa province sont occupés par des habitations humaines, et les espaces verts périphériques n'en forment qu'environ un quart. Le climat est tropical humide, avec quatre mois de saison sèche (mi-mai à mi-septembre) et huit mois de saison des pluies (mi-septembre à mi-mai) (Koy Kasongo 2010). La pêche de subsistance y est fortement développée et la pression qui s'exerce sur les oiseaux ichthyophages et leurs sites a augmenté. La région de Kinshasa est caractérisée par l'absence de forêts, la présence de cours d'eau et caniveaux insalubres dans lesquels se développent divers insectes et le petit poisson *Gambusia* *Gambusia affinis*. La nouvelle cité regroupe les communes de la périphérie de la région. On y trouve des étangs de pisciculture dans quelques lambeaux forestiers. C'est dans ces derniers que tous les sites de nidification et nids du Martin-pêcheur huppé ont été observés. Cette étude porte sur les sites de nidification du Monastère et des Symphonies de Nda-Gye (voir descriptions par Kisasa Kafutshi 2012a).

Dans ces deux sites, 127 nids ont été suivis pendant la période de septembre 2004 à avril 2009, pour le comptage des œufs (à l'aide d'une lampe de terrier muni d'un petit miroir), pour le baguage des jeunes et dans la mesure du possible des adultes après l'ouverture du nid. Ce suivi a permis de déterminer quelques variables de la reproduction. La taille de ponte est le nombre des œufs observés dans un nid. La durée d'incubation a été estimée comme le temps entre la ponte du premier œuf et la naissance du premier poussin, bien que l'on ne sache pas pour cette espèce si l'incubation ne commence pas avant la ponte du dernier œuf (dans ce cas, la période d'incubation serait l'intervalle entre la ponte du dernier œuf et l'éclosion du premier). La durée de l'incubation dérivée des cas connus ($n = 94$ pontes) étant de 15 jours (voir Résultats), cela permet l'estimation de la date de ponte du premier œuf à partir de la date d'éclosion du premier œuf, pour les nids dans lesquels je ne l'ai pas observée directement ($n = 6$ pontes). L'âge et la durée d'élevage de 121 jeunes ont été estimés à partir des observations directes de leur naissance à la sortie de nid (cela a été possible une fois les œufs repérés et suivis régulièrement) La durée d'élevage a été estimée comme

l'intervalle de jours entre la naissance du premier poussin et la sortie du nid du dernier poussin. Le succès de reproduction est le rapport correspondant au nombre total des jeunes produits au nombre total des œufs pondus dans un site pendant la période de l'étude.

L'ouverture des nids et le baguage des nichées ont été effectués après l'éclosion de tous les œufs du nid, pour éviter l'abandon des œufs (un seul cas observé dans cette étude). Pour ce faire, il est nécessaire de creuser un accès indépendant du tunnel d'envol à l'aide d'une pelle appropriée. L'accès est pratiqué, soit latéralement, soit derrière le nid en fonction de la disposition des lieux. Les jeunes sont capturés et bagués entre le 3ème et le 16ème jour après l'éclosion. Les mesures étaient réalisées à l'aide d'un peson (100 g avec une précision de 1 g) et d'un pied à coulisse (précision 0,1 mm). Puis, ils sont relâchés au nid et enfin l'accès crée est soigneusement refermé tout en évitant l'éboulement du nid. La masse corporelle ainsi que diverses mensurations ont été relevées à intervalles réguliers (un ou deux jours) de la manière suivante: longueur de la mandibule supérieure, de l'extrémité antérieure de la narine à la pointe du bec; longueur de la mandibule inférieure, de la pointe du bec à la base; longueur de la première rémige primaire, de la base à l'extrémité; longueur de la première rémige secondaire, de la base à l'extrémité; longueur des rectrices, de la base à l'extrémité; longueur du tarse gauche, de la base à l'extrémité; taille du corps, de l'extrémité du bec à l'extrémité du croupion sans rectrices.

Résultats

Les pontes ont été observées exclusivement pendant la saison pluvieuse. le nombre de pontes le plus important ayant été enregistré entre février et avril (Fig. 1).

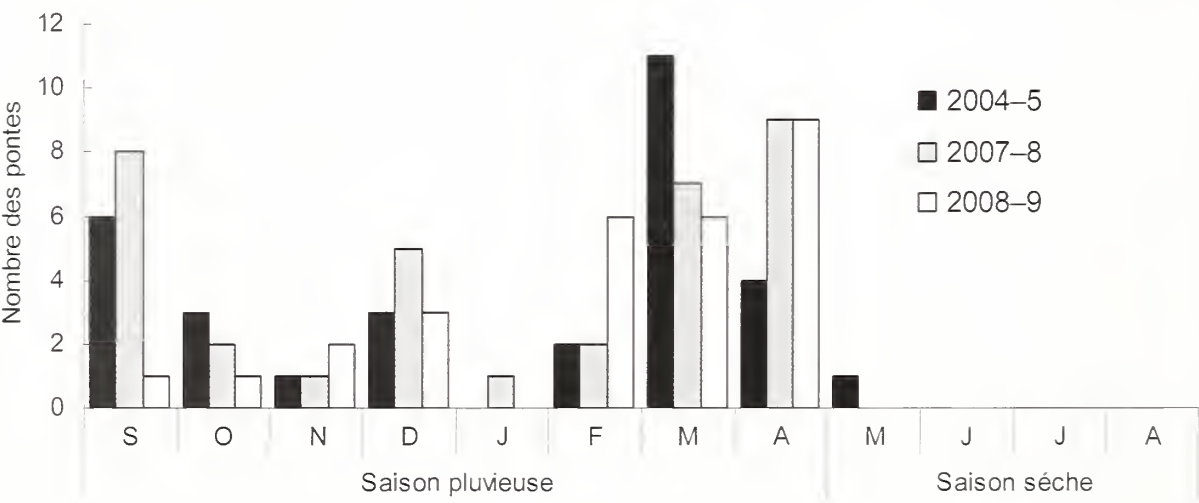


Figure 1. Distribution du mois de ponte pour les 94 pontes du Martin-pêcheur huppé observées dans la région de Kinshasa. Le seul nid de mai était du début du mois, et tous les nids de septembre étaient de la deuxième partie du mois.

Les variables de nidification pour les premières et les deuxièmes nichées sont présentées dans le Tableau 1: il n'y a aucune différence significative entre les valeurs des premières et des deuxièmes nichées (Mann-Whitney U, $P > 0,05$). La taille de ponte était de 2–4 œufs (soit 32 pontes de deux œufs, 55 de trois et sept pontes de quatre); en plus, cinq œufs ont été trouvés détruits dans un nid qui a semblé récemment abandonné. Sur les 257 œufs pondus dans l'ensemble ($n = 94$ pontes), 138 jeunes ($n = 67$ nichées) ont pu survivre et être élevés, bagués et envolés. La destruction des nids paraît la cause principale de la diminution de taux de reproduction pour les secondes nichées (Kisasa Kafutshi & Aloni Komanda 2011, Kisasa Kafutshi 2012). Cette destruction peut être involontaire (le sable utilisé dans les constructions anarchiques des maisons au voisinage des sites de nidification est extrait sur les falaises de nidification occasionnant ainsi la destruction des nids, des œufs et parfois des jeunes) ou volontaire (l'oiseau est souvent piégé, chassé et tué comme concurrent indésirable aux pisciculteurs lorsqu'il installe son nid au voisinage des étangs). Les nids ayant survécu à la destruction étaient soigneusement nettoyés par les couples nicheurs avant de les réutiliser pour de nouvelles pontes, ce qui justifierait l'absence des ectoparasites chez tous les oiseaux capturés.

Jusqu'à l'âge d'environ trois jours, les poussins étaient nus, aveugles, avec la mandibule inférieure plus longue que la supérieure (les deux mandibules étant noires), et deux des trois doigts soudés. Visiblement, seuls leur taille et leur poids changeaient (Tableau 2). Le plumage des jeunes émerge essentiellement entre le 5ème et le 9ème jour (Fig. 2). Les gaines des plumes sont perceptibles sous la peau dès le 5ème jour. Les rémiges primaires et secondaires percent les premières puis les ptéryles spinales, ventrales émergent aux environs du 7ème jour. Les rectrices, les plumes des faces dorsales et latérales de la tête, des ptéryles humérales et fémorales émergent aux environs du 9ème jour et les trois doigts sont libres, les yeux sont ouverts et la mandibule supérieure dépasse légèrement l'inférieure (de 2,8 mm). Dès le 11ème jour, tout le corps des poussins est couvert à la fois des fourreaux et des plumes. Et enfin, du 13 au 17ème jour tout le corps des poussins est complètement couvert de plumes.

La masse pondérale a été croissante jusqu'au 13ème jour. A partir de cet instant, la courbe a plafonné (Fig. 3). La courbe présente deux phases de croissance: une augmentation du poids caractérisée par l'émergence de plumes et l'ouverture d'yeux (9–13ème jour) puis une perte de poids d'environ 0,8 g à la sortie du nid.

Le Tableau 2 permet de voir à quel point de développement les jeunes se trouvent lorsqu'ils quittent le nid, et de déterminer les structures ayant terminé leur croissance et celles qui continuent encore à grandir après l'envol. Lorsqu'ils quittent le nid, les jeunes avaient presque la taille corporelle des adultes, mais toutes les structures chez les poussins continuent à croître après l'envol. Cependant les différents rapports de tailles obtenus montrent que cette croissance varie d'une structure à l'autre. Le tarse et la rémige primaire ont pratiquement leur taille adulte tandis que les mandibules, les rectrices et les rémiges secondaires doivent encore croître de manière substantielle (Tableau 2).

Tableau 1. Variables de nidification pour la première et deuxième nichée chez le Martin-pêcheur huppé. Les données présentées sont: moyenne \pm écart type (n) minimum-maximum.

	Première nichée	Deuxième nichée	Dans l'ensemble
Intervalle (jours) entre deux pontes du même couple (n = nombre des deuxièmes pontes)			46,4 \pm 30,62 (37) 28-111
Taille de pontes (n = nombre de pontes)	2,3 \pm 0,57 (57) 2-4	2,8 \pm 0,45 (37) 2-4	2,5 \pm 0,59 (94) 2-4
Durée d'incubation (n = nombre des pontes)	15,1 \pm 0,36 (57) 15-16	15,2 \pm 0,50 (37) 15-17	15,0 \pm 0,49 (94) 15-17
Taille de nichées (n = nombre des nichées)	2,5 \pm 1,33 (40) 0-4	2,5 \pm 1,10 (27) 0-3	2,7 \pm 0,97 (67) 0-4
Durée d'élevage (n = nombre des nichées)	16,1 \pm 0,34 (40) 16-17	16,2 \pm 0,27 (27) 16-17	16,1 \pm 0,31 (67) 16-17
Jeunes produits (n = nombre de nichées)	2,7 \pm 0,73 (40) 2-4	2,8 \pm 0,54 (27) 2-4	2,8 \pm 0,62 (67) 2-4
Durée de nidification (incubation + élevage) (n = nombre de nichées)	31,4 \pm 0,62 (40) 31-33	31,0 \pm 0,52 (27) 31-33	31,1 \pm 0,58 (67) 31-33
Succès de reproduction (% des jeunes envolés par rapport au nombre total des œufs pondus)	87,7	45,5	67,3

Tableau 2. Données morphométriques (mm) et masse corporelle (g) de 121 poussins et de 57 adultes du Martin-pêcheur huppé.

Age (jour)	Mandibule supérieure	Mandibule inférieure	1ère rémige primaire	1ère rémige secondaire	Rectrices	Tarse	Taille du corps	Masse
3	9,8 \pm 0,6	10,2 \pm 0,7	-	-	-	5,4 \pm 0,7	55,9 \pm 5,5	6,4 \pm 0,5
5	13,9 \pm 1,9	14,1 \pm 1,8	-	-	-	6,2 \pm 0,8	61,0 \pm 4,5	7,9 \pm 0,5
7	16,1 \pm 1,3	16,0 \pm 1,7	-	-	-	6,8 \pm 0,6	66,0 \pm 4,1	9,2 \pm 0,5
9	18,1 \pm 1,4	17,8 \pm 1,6	21,8 \pm 6,4	9,7 \pm 2,1	7,0 \pm 3,4	7,0 \pm 0,0	66,7 \pm 3,2	11,3 \pm 0,9
11	20,3 \pm 1,3	19,8 \pm 1,1	23,5 \pm 6,6	10,7 \pm 2,2	10,0 \pm 2,3	7,0 \pm 0,5	71,0 \pm 4,2	13,1 \pm 0,8
13	22,0 \pm 1,0	21,0 \pm 1,0	26,8 \pm 4,0	13,0 \pm 1,9	10,4 \pm 2,0	7,1 \pm 0,0	73,3 \pm 4,0	14,7 \pm 0,7
15	23,0 \pm 0,8	22,1 \pm 1,0	30,1 \pm 3,6	13,6 \pm 1,5	12,2 \pm 1,7	7,1 \pm 0,6	75,5 \pm 2,3	14,3 \pm 0,4
16 (J16)	24,1 \pm 1,1	23,2 \pm 1,1	32,7 \pm 3,8	14,8 \pm 1,7	13,1 \pm 1,8	7,2 \pm 0,4	78,0 \pm 1,3	14,3 \pm 0,4
Adultes (A)	35,0 \pm 0,3	33,0 \pm 0,2	39 \pm 1,1	22,0 \pm 3,3	19,0 \pm 0,8	8,0 \pm 0,1	120,0 \pm 2,7	17,0 \pm 1,8
Rapport J16:A	0,69	0,70	0,84	0,67	0,69	0,90	0,65	0,84



Figure 2. Photos illustratives des caractéristiques morphologiques des poussins du Martin-pêcheur huppé de l’éclosion à la sortie du nid. Les numéros indiquent l’âge des poussins (jours après l’éclosion).

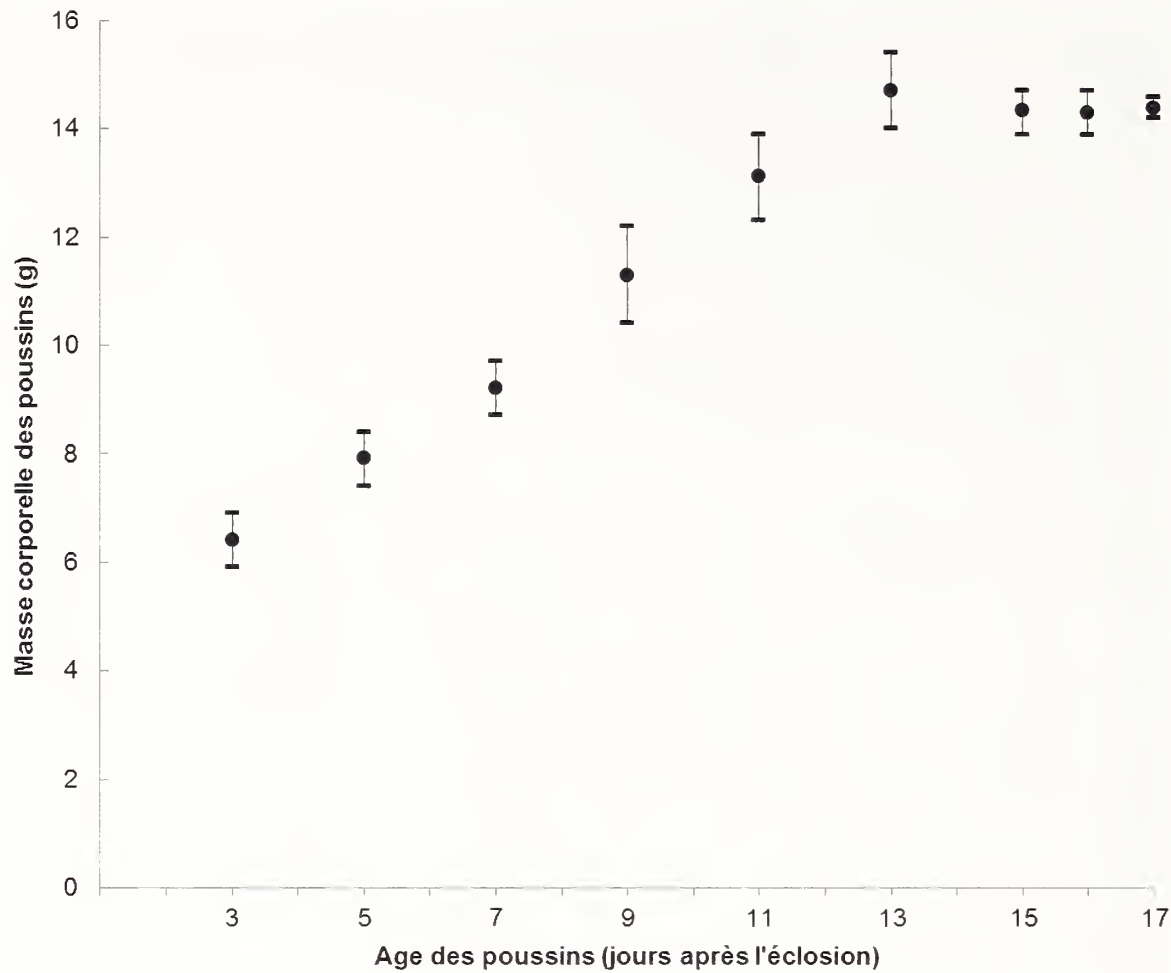


Figure 3. Croissance pondérale de 121 poussins (seulement sept le 17ème jour) du Martin-pêcheur huppé (moyenne \pm écart-type).

Des 57 adultes bagués et relâchés, 12 ont été recapturés les années suivantes dans le même site mais avec des partenaires différents. Deux sur 138 jeunes bagués et relâchés ont été recapturés comme adultes nicheurs, 1–3 ans après avoir quitté les nids.

Discussion

Dans la région de Kinshasa, la ponte du Martin-pêcheur huppé a été observée uniquement en saison des pluies. Au sud du Katanga en République Démocratique du Congo, Lippens & Wille (1976) ont observé sa ponte en saison sèche comme en saison pluvieuse (déjà à partir de janvier). Au Kenya, c’est aussi pendant la saison des pluies que les pontes ont été observées (Imboma & Nalinya 2007). C’est probablement la disponibilité de la nourriture, fortement corrélée avec la latitude, qui serait un facteur déterminant de l’activité reproductrice (Morel & Morel 1971). A Kinshasa comme au Katanga, à chaque saison sèche, les feux de brousse sont

provoqués dans les savanes herbeuses pour préparer le sol à l'agriculture sur brûlis. Les étangs sont vidangés (une des techniques les plus utilisées habituellement pendant la saison sèche pour capturer les poissons et nettoyer les étangs). Ces deux pratiques contribueraient à la diminution de la disponibilité des petits poissons et insectes exploités par le Martin-pêcheur huppé et pourraient expliquer l'absence de ponte pendant la saison sèche dans la région de Kinshasa.

La taille des pontes du Martin-pêcheur huppé varie de deux à quatre (mode trois) œufs. Lippens & Wille (1976) parlent de trois œufs et Woodall (2001) de trois à quatre.

La durée d'incubation et d'élevage chez le Martin-pêcheur huppé est de 31–33 jours; il est court comparativement aux autres espèces de la famille. Chez le Martin-pêcheur d'Europe *Alcedo atthis*, elle est de 46–48 jours (21 jours d'incubation et 25–27 d'élevage des poussins: Doucet 1971, Hallet-Libois 1985), et pour le Martin-pêcheur pie *Ceryle rudis* 44 jours (18 d'incubation et 26 d'élevage: Reyer 1980). La taille de l'espèce ainsi que le climat pourraient expliquer la durée de nidification (Ricklefs 1968).

La première partie de la courbe de croissance pondérale des poussins (Fig. 3) présente une allure sigmoïdale. L'augmentation du poids est particulièrement prononcée entre le 5^{ème} et le 13^{ème} jour (soit 6–15 g). Par la suite, les jeunes maigrissent concomitamment avec la restriction alimentaire partielle (Kisasa Kafutshi 2012) et, au moment de l'envol, ils pèsent *c.* 14 g. Ce fait a été aussi signalé chez le Martin-pêcheur d'Europe (Hallet-Libois 1985). La perte de masse corporelle ne modifie pas les autres paramètres de la croissance tels que la taille corporelle et la maturation des fonctions (Tableau 3).

Eastman (1969) suggère que chez les poussins inexpérimentés des martins-pêcheurs, le mouillage constant des plumes suite aux tentatives répétées de pêche est une cause majeure de mortalité juvénile. La nécessité d'un vol rapide et précis pour la pêche et d'une protection efficace du corps contre l'eau pourraient expliquer la maturité des rémiges primaires au moment de la sortie du nid. Ce fait a également été observé chez le Martin-pêcheur d'Europe (Hallet-Libois 1985), dont les jeunes sont encore nourris quelques jours après la sortie du nid. Il est cependant difficile de confirmer le nourrissage de jeunes du Martin-pêcheur huppé quelques jours après l'envol. Tous les nids étaient très secs, et ne présentaient aucun signe de vie après l'envol des poussins. Le nombre faible des jeunes recapturés ne serait-il pas imputable d'une part à l'existence d'une structure sociale basée sur une territorialité stricte et l'intolérance des adultes reproducteurs vis-à-vis de leurs jeunes une fois envolés comme chez le Martin-pêcheur d'Europe (Libois 1994) et d'autre part à la quiétude du site ?

La croissance du bec est régulière mais lente (Tableau 2). Il en résulte qu'à l'envol, le bec des jeunes est beaucoup plus petit que celui des adultes (69–70 %). Cela signifierait qu'un long bec n'est pas un élément capital pour la survie des oiseaux, c'est-à-dire pour la pêche (O'Connor 1977). Chez le Martin-pêcheur d'Europe, les jeunes sont capables de se nourrir eux-mêmes dès l'envol et ce malgré leur petit bec (Codourey 1967, Hallet-Libois 1985).

Jusqu'au 5ème jour environ, la mandibule inférieure des poussins du Martin-pêcheur huppé dépasse la supérieure, ensuite c'est le contraire à partir du 9ème jour (Tableau 2). Ce fait a été aussi signalé chez d'autres alcédinidés comme le Martin-pêcheur d'Europe (Hallet-Libois 1985) et l'Alcyon géant *Megaceryle maxima* (Dowsett 1971). On peut dès lors se demander si ces différences répondent à une fonction. Les poussins des martins-pêcheurs sont nourris avec des poissons entiers qui sont engagés tête la première dans leur gosier. Chez les petits poussins qui réclament la nourriture en dressant le cou verticalement et dont la dimension du bec est faible, la présence d'une mandibule inférieure plus grande faciliterait le positionnement de la proie. Par contre, pour la préhension une mandibule supérieure légèrement plus grande que l'inférieure est probablement plus commode. Hallet-Libois (1985) note que les différences s'inversent au moment où les jeunes commencent à rester seuls, lorsqu'ils sont capables d'assurer eux-mêmes leur thermorégulation par l'acquisition des plumes; ils se tiennent alors à l'entrée de la chambre, la tête tournée vers le tunnel et le nourrissage se fait dans une position horizontale. Dans ces conditions, l'avantage pour tous les jeunes alcédinidés d'avoir une mandibule inférieure plus longue serait indiscutablement moindre. Chez le Martin-pêcheur canadien *Megaceryle alcyon*, la thermorégulation augmente avec la croissance et le développement du plumage, les plumes ne jouant toute fois un rôle isolant qu'une fois sorties de leur fourreau (Hamas 1994). Ces observations sont vraisemblablement transposables au Martin-pêcheur huppé. Ces trois espèces ont en effet des mœurs fort semblables: nidification saisonnière dans le terrier, jeunes nus et aveugles à l'éclosion et restant plus d'une semaine au nid.

Les paupières se forment puis s'ouvrent dès le 9ème jour après l'éclosion. Lorsque les parents arrêtent le réchauffement, les poussins sont donc capables de voir. Ceci faciliterait le nourrissage, les jeunes pouvant mieux se positionner pour quémander la becquée (Hallet-Libois 1985).

Remerciements

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Additions and corrections to the avifauna of Ebo Forest, Cameroon

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Summary

In the course of three weeks of field work in Ebo Forest (Cameroon) in January–February 2001, our observations included 75 species new to the list for the forest, and result in some corrections to the previously published list.

Résumé

Additions et corrections à l'avifaune de la Forêt d'Ebo, Cameroun. Lors de trois semaines de travail de terrain dans la forêt d'Ebo (Cameroun) en janvier–février 2001, nous avons observé 75 espèces supplémentaires et apportons quelques corrections à la liste publiée des oiseaux de la forêt.

Introduction

Whytock & Morgan (2010) published a list of the birds of the Ebo forest and surrounding farmland, based on their surveys, over a period of 12 weeks in 2008. They refer to our own work in the area (Dowsett-Lemaire & Dowsett 2001) by stating that we did just a “four-day assessment at a single locality in 2000” (Whytock & Morgan 2010, p. 23). This is incorrect, as is clear from our itinerary, map and gazetteer: we organized three expeditions into the forest, from Ndokmen Nord to Mt Kak in the north (7–15 Jan 2001), to the Ekem and Ebo rivers in the south (17–22 Jan 2001) and again in the north, from Logndeng to Békob (8–12 Feb 2001). This is a total of 18 days, to which we can add a couple of days travelling along the eastern edge of the forest on 2–4 Feb, as far as the village of Lognanga, where we camped (Fig. 1).

Whytock & Morgan (2010) also wrote (p. 23) that our list did not distinguish species recorded in Ebo from those found elsewhere in the region. This is again incorrect: for many species of local or rare occurrence, we gave exact localities within Ebo, and we meant that “common and widespread” species could be assumed to have been in Ebo as well as other prospected forests. More specifically, Whytock & Morgan (2010, p. 30) wrote that both Rachel's Malimbe *Malimbus racheliae* and

Red-bellied Malimbe *M. erythrogaster* had presumably been omitted from the “remarkably accurate” maps of Borrow & Demey (2004) for the region, because neither was observed by us. In fact, Borrow & Demey (2004) had simply not seen our report: we observed Red-bellied Malimbe near Mt Kak, inside Ebo, and Rachel’s Malimbe near the river Grand Nouya (Dowsett-Lemaire & Dowsett 2001, p. 37), a few km to the north of Ebo, this river taking its source in the Ebo forest.

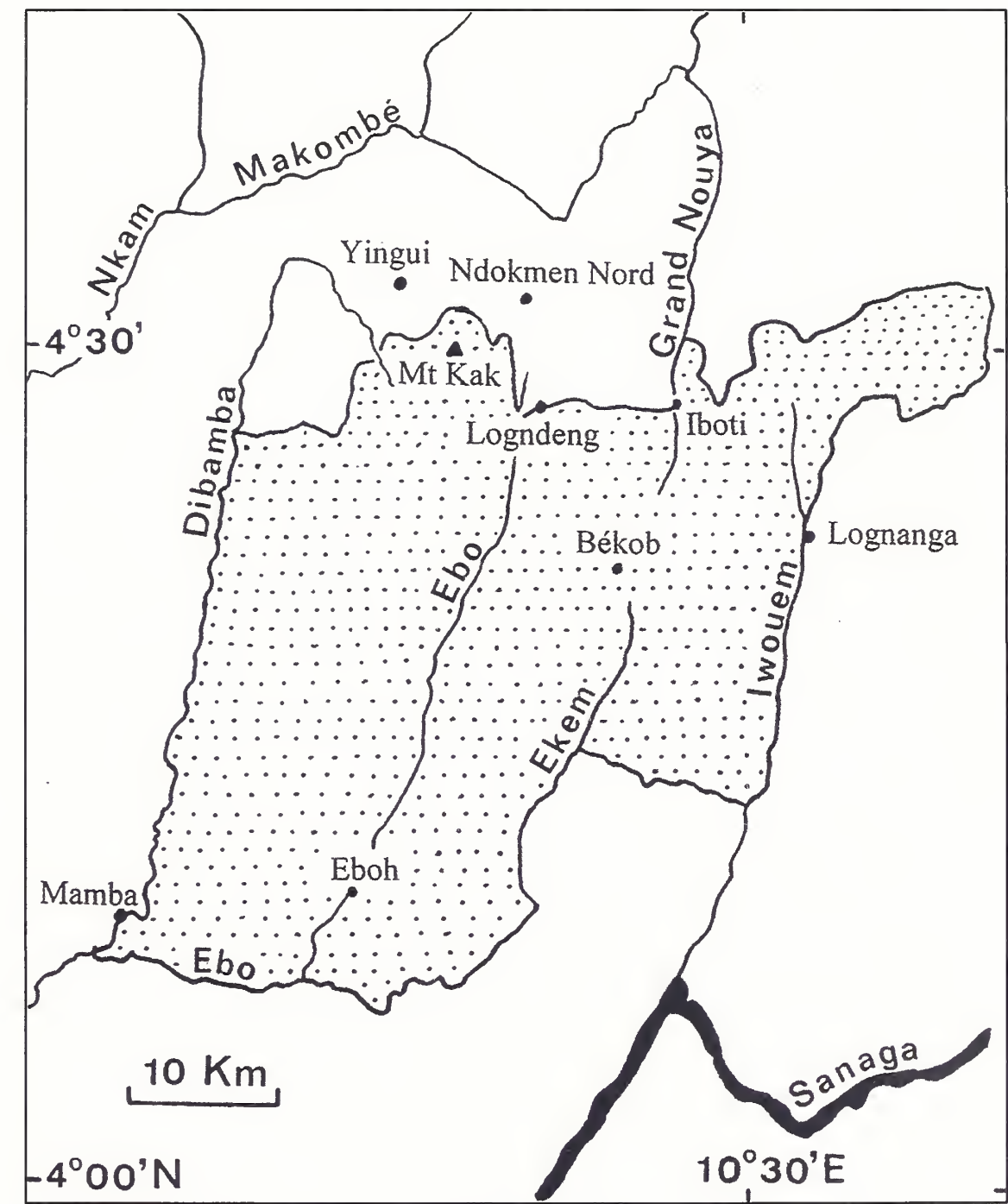


Figure 1. Map of the Ebo forest (stippled) showing rivers and main localities; adapted from the map in Dowsett-Lemaire & Dowsett (2001).

In 2000, the official size of Ebo forest (not given by Whytock & Morgan 2010) was 1417 km² and it was then proposed as a “Sanctuaire de Faune” (MINEF 2000). R. Whytock (*in litt.* 2011) informs us that most of this forest (1114 km²) has now been proposed as a National Park. The altitudinal range is 9–1207 m. Even though Whytock & Morgan (2010) do not define the boundaries of what they call Ebo forest, the rough outline in their Fig. 1 corresponds to that of the forest on our map, except perhaps for the far northeast corner (Fig. 1). Due probably to very shallow soils, Ebo forest is more markedly semi-evergreen than forests to the north and west. Most of the forest on hills has a low canopy with widely spaced emergents. Selective logging within Ebo was confined to the Ebo valley in the north, and more recently (2000 onwards) in the far south (Ekem confluence). A few small villages existed in the north, but they were all evacuated in 1959–60. Békob is the site of an abandoned village; Eboh in the south was in 2001 a recently established village of professional hunters, and the only village in the reserve. Further details on forest structure and vegetation can be found in Dowsett-Lemaire & Dowsett (2001).

Methods

Details of locations are taken directly from our report (Dowsett-Lemaire & Dowsett 2001). Corrections to species' names, and species already recorded by Whytock & Morgan (2010) but to which we gave a significantly different status or habitat, are given in []. For ease of reference we use the bird names of Borrow & Demey (2004), except for Collared Sunbird, as the genus *Hedydipna* is incorrect (Mann & Cheke 2006): the resurrected genus *Anthodiaeta* has not been defined in relation to the broader genus *Anthreptes*, so we prefer to retain Collared Sunbird in the latter. Abundance abbreviations (as defined in Whytock & Morgan 2010) follow the species names: A = Abundant, C = Common; F = Frequent; records of anything less than Frequent are uncoded and given in more detail. Habitat categories also follow Whytock & Morgan (2010) but their categories 4 and 7 are not used in the list below, and swamp forest (2) as used here is not necessarily dominated by *Raphia*. Their category 1 (“closed canopy secondary forest and *occasionally* primary forest at hill summits” our italics) suggests that most forest in Ebo is secondary. This is true around Békob, but not in most parts of the forest. For birds of aerial space (one raptor, swifts, one swallow), a category not recognized by Whytock & Morgan (2010), we give no number.

Results

We present below 75 additions and some corrections to the list of Whytock & Morgan (2010).

Phalacrocoracidae

Phalacrocorax africanus Long-tailed Cormorant. F, 6. A few on Ebo, Ekem and lower Iwouem rivers.

Anhinga rufa African Darter. 6. One on the Ekem River.

Ardeidae

Butorides striata Green-backed Heron. 6. One pair on the Ekem and lower Iwouem rivers.

Threskiornithidae

Bostrychia rara Spot-breasted Ibis. 2. One flushed from marshy stream, foothills of Mt Kak.

Anatidae

Pteronetta hartlaubi Hartlaub's Duck. 6. A pair on a stream at Ndokmen Nord, on the Ebo river (near Eboh village) and lower Iwouem.

Accipitridae

[*Accipiter tachiro* African Goshawk. C, 1. Whytock & Morgan (2010) classified this species as U; we consider this to be the commonest *Accipiter*, heard singing regularly at dawn. It is certainly more common than Black Sparrowhawk *A. melanoleucus*, which they classified as F.]

Hieraaetus pennatus Booted Eagle. One (pale phase) at Eboh, 17 January.

Rallidae

Sarothrura pulchra White-spotted Flufftail. C, 1, 2. Almost throughout, on small or marshy streams and depressions.

S. elegans Buff-spotted Flufftail. 1. We heard this species outside Ebo, but the local hunters knew the voice well, as at Ndokmen Nord and Logndeng.

Heliornithidae

Podica senegalensis African Finfoot. F, 6. Seen on the Ebo river at Eboh, Ekem river and near Ndokmen Nord.

Glareolidae

Glareola nuchalis Rock Pratincole. 6. A dozen on the lower Iwouem river.

Scolopacidae

Actitis hypoleucos Common Sandpiper. C, 6. A few on all rivers.

Columbidae

Columba iriditorques Western Bronze-naped Pigeon. 1. One pair at Lognanga.

Aplopelia larvata Lemon Dove. 1. Found only on Mt Kak, one pair seen and another bird singing, at 850–950 m altitude.

Cuculidae

Chrysococcyx caprius Didric Cuckoo. 3. Heard at Logndeng and Lognanga.

Strigidae

Bubo poensis Fraser's Eagle Owl. 3. One heard at Lognanga.

B. leucostictus Akun Eagle Owl. 1. One heard and reacted to tape on slopes of Mt Kak.

Scotopelia bouvieri Vermiculated Fishing Owl. 2. One singing near Békob (in *Raphia* and mixed forest on a stream, 900 m altitude).

Glaucidium tephronotum Red-chested Owlet. 1. One singing on the slopes of Mt Kak.
G. sjostedti Sjöstedt's Owlet. C, 1. The common owl of the region in primary forest, up to three heard from one spot (e.g. Mt Kak).

Apodidae

Telacanthura melanopygia Black Spinetail. One pair over the Ebo river at Eboh, several around the Ekem river.

Neafrapus cassini Cassin's Spinetail. F. More widespread than Sabine's Spinetail *Rhapidura sabini*, including Ebo forest (Békob) and the Ekem river.

Apus apus Common Swift. A. Large flocks seen throughout the region.

A. batesi Bates's Swift. A few around the Ekem river.

Trogonidae

[*Apaloderma aequatoriale* Bare-cheeked Trogon. F, 1. Not "rare" as in Whytock & Morgan 2010), but met at all localities, in small numbers, sometimes two calling close to each other.]

Alcedinidae

Alcedo quadribrachys Shining Blue Kingfisher. F, 6. On various small streams and rivers (e.g. Ebo and Ekem).

A. leucogaster White-bellied Kingfisher. F, 1. Widespread, near small streams.

Megaceryle maxima Giant Kingfisher. F, 6. Widespread on large, rocky rivers (Ebo, Ekem, Iwouem).

Meropidae

Merops muelleri Blue-headed Bee-eater. 1. One pair, in small gaps in canopy, between Mamba and Eboh.

Coraciidae

[*Eurystomus gularis* is the correct name for Blue-throated Roller, not "*E. glaucurus*" as in Whytock & Morgan (2010).]

Bucerotidae

Tockus hartlaubi Black Dwarf Hornbill. 1. One pair with a juvenile between Mamba and Eboh, and one singing on the slopes of Mt Kak.

Lybiidae

Gymnobucco peli Bristle-nosed Barbet. 3. Some colonies at Lognanga.

Indicatoridae

Indicator maculatus Spotted Honeyguide. 1. One in song near Mt Kak, another on way from Logndeng to Békob.

I. conirostris Thick-billed Honeyguide. 1. One singing at foot of Mt Kak, another on way from Logndeng to Békob.

Picidae

Campethera cailliautii Green-backed Woodpecker. 1. One heard near Ndokmen Nord.

Dendropicos gabonensis Gabon Woodpecker. 3, 2. Single birds heard in secondary forest at Ndokmen Nord and Lognanga, and in open swamp forest at Békob.

Hirundinidae

Psalidoprocne nitens Square-tailed Saw-wing. One near Eboh.

[*P. pristoptera* Black Saw-wing. Unlike Whytock & Morgan (2010), we did not record this species in Ebo, but only in clearings at higher altitudes outside the area (Mt Nlonako, savannas of the Bafang Plateau north of Nkondjock). Whytock & Morgan (2010) placed this species in Habitat 1, but this swallow is unlikely to be in primary or old secondary forest.]

Hirundo nigrita White-throated Blue Swallow. 6. Small numbers on the Iwouem river.

Campephagidae

Campephaga phoenicea Red-shouldered Cuckoo-shrike. 3. Three in female plumage at Lognanga on 3 Feb, perhaps on passage.

C. quiscalina Purple-throated Cuckoo-shrike. 2. In open-canopy swamp forest near Békob (two pairs), thus much more local than Blue Cuckoo-shrike.

[*Coracina azurea* Blue Cuckoo-shrike. At least F, rather than “uncommon” as in Whytock & Morgan (2010).]

Pycnonotidae

Andropadus gracilis Little Grey Greenbul. 1, 2. Local in humid valley bottoms: a few at Békob (including swamp forest) and Eboh.

[*A. ansorgei* Ansorge’s Greenbul. C, 1. At all localities; not “uncommon” as in Whytock & Morgan (2010).]

Calyptocichla serina Golden Greenbul. F, 1. Widespread species of open canopy and edge of large rivers.

Baeopogon clamans Sjöstedt’s Honeyguide Greenbul. F, 1. Widespread in understorey of primary forest, especially near streams.

Turdidae

Sheppardia cyornithopsis Lowland Akalat. 1. This mid-altitude species was located once from its calls on the way from Logndeng to Békob (900–1000 m).

Cossypha cyanocampter Blue-shouldered Robin Chat. 5. One heard at Békob (in *Aframomum* and *Marantaceae*).

Sylviidae

Eremomela badiceps Rufous-crowned Eremomela. F, 1, 3. Békob.

Macrosphenus flavicans Yellow Longbill. F, 1. Present wherever there are thickets, although somewhat more localized than Grey Longbill *M. concolor*.

Phylloscopus sibilatrix Wood Warbler. 1. A few in open canopy, slopes of Mt Kak.

Hylia prasina Green Hylia. F, 1. Locally common at higher altitudes, or more humid areas: Ebo valley, Logndeng to Békob, Mt Kak.

Cisticolidae

Apalis nigriceps Black-capped Apalis. F, 1. Widespread, especially in open canopy.

A. rufogularis Buff-throated Apalis. C, 1, 3. Throughout.

Muscicapidae

[*Fraseria cinerascens* White-browed Forest Flycatcher. F, 1 with 6. Noted as “rare” by Whytock & Morgan (2010), but we found it in forest understorey along all major rivers (such as the Ebo and Ekem). Habitat 6 (streams and rivers) should be added, as the species depends on the proximity of watercourses.]

- Muscicapa olivascens* Olivaceous Flycatcher. U, 1. A few, up to 1100 m on Mt Kak.
M. cassini Cassin's Grey Flycatcher. F, 6. Forested banks of all large rivers, including the Ebo, Ekem and Iwouem.
M. epulata Little Grey Flycatcher. 1. One singing at Békob.
M. caerulescens Ashy Flycatcher. 3. One singing at Lognanga.
M. infuscata Sooty Flycatcher. 3. Several family parties near Ndokmen Nord.

Platysteiridae

- Bias musicus* Black-and-white Flycatcher. 3. One pair at Logndeng (open forest).
Batis poensis Bioko Batis. F, 1, 3. A few heard in secondary forest near Logndeng and Lognanga and in open canopy on slopes of Mt Kak.
[Dyaphorophya tonsa White-spotted Wattle-eye. 1. One bird on slopes of Mt Kak. In Ebo (and elsewhere) this species is confined to subcanopy of primary forest, thus Whytock & Morgan's (2010) record in "low vegetation on basalt outcrops" (Habitat 7), is surprising.]

Monarchidae

- Elminia nigromitrata* Dusky Crested Flycatcher. F, 1. Forest understorey.

Remizidae

- Pholidornis rushiae* Tit-hylia. 1. Two birds in secondary forest at Békob (900 m).

Nectariniidae

- Anthreptes rectirostris* Green Sunbird. C, 1. Widespread in open canopy.
[A. collaris Collared Sunbird. C, 1. Noted as "uncommon" by Whytock & Morgan (2010), but common throughout any forest.]
A. seimundi Little Green Sunbird. 3. One pair at forest edges at Eboh.
Cyanomitra oritis Cameroon Sunbird. 1. At least one heard on the mountain between Logndeng and Békob; probably heard on Mt Kak, above 1000 m.
Chalcomitra rubescens Green-throated Sunbird. F, 3. Forest edges at Lognanga and old secondary forest at Békob.
Cinnyris batesi Bates's Sunbird. F, 1. A few seen well on Mt Kak and near Békob, above 800 m.
C. chloropygius Olive-bellied Sunbird. C, 3. Throughout, in farmbush.
C. minullus Tiny Sunbird. F, 1. In secondary forest at Ndokmen Nord, at Békob and between Mamba and Eboh.
C. superbis Superb Sunbird. F, 3. A few at Ndokmen Nord and Lognanga.

Zosteropidae

- Zosterops senegalensis* Yellow White-eye. 1. One pair in old secondary forest at Békob, 900 m.

Malaconotidae

- Dryoscopus senegalensis* Black-shouldered Puffback. 1, 2. In open forest near water, Logndeng and Békob, one pair at each place.
D. sabini Sabine's Puffback. C, 1. Widespread in canopy of primary and secondary forest.
Laniarius leucorhynchus Sooty Boubou. 2, 3. In moist thickets at Ndokmen Nord and swamp forest at Békob, one pair duetting at each place.

Malaconotus multicolor Multi-coloured Bush Shrike. 1. One in forest canopy at Békob (900 m).

M. cruentus Fiery-breasted Bush Shrike. 2. Two pairs in open, swamp forest near Békob.

Oriolidae

[*Oriolus nigripennis* Black-winged Oriole. Although Whytock & Morgan (2010) list this species for Ebo, in our experience in western Cameroon north of the Sanaga it is not found at low or medium elevations, where Western Black-headed Oriole *O. brachyrhynchus* occurs, but replaces the latter at higher altitudes. We therefore feel its occurrence at Ebo requires confirmation. The nearest location where we have found this species was on the slopes of Mt Nlonako, above 1300 m (Dowsett-Lemaire & Dowsett 2001).]

Sturnidae

Poeoptera lugubris Narrow-tailed Starling. 3. A pair near a colony of *Gymnobucco* barbets, at Lognanga.

[*Lamprotornis splendidus* is the correct name for Splendid Glossy Starling, not *L. "purpureus"* as in Whytock & Morgan (2010).]

Ploceidae

Ploceus albinucha Maxwell's Black Weaver. 1. Some in a bird party on Mt Kak (950 m).

Malimbus rubricollis Red-headed Malimbe. 1. One pair in open canopy at Békob.

Estrildidae

Mandingoa nitidula Green Twinspot. 3. A pair in an overgrown garden at Logndeng.

Discussion

Altogether we recorded some 212 species in three weeks. Our additions represent a substantial proportion of the forest avifauna. Many come from the Békob area where Whytock & Morgan (2010) had a base camp. Why these species, which were listed in Dowsett-Lemaire & Dowsett (2001), were overlooked in their paper is unclear. They recorded a few forest species additional to our list, as follows: White-crested Tiger Heron *Tigriornis leucolopha*, Red-chested Cuckoo *Cuculus solitarius* (although we doubt that this bird would qualify as "abundant", meaning around 11–100 seen or heard daily), Sandy Scops Owl *Otus icterorhynchus*, African Piculet *Sasia africana*, Shrike Flycatcher *Megabyas flammulatus* and Forest Chestnut-winged Starling *Onychognathus fulgidus*. It would be interesting to know where they recorded Banded Prinia *Prinia bairdii* and Black Saw-wing, as these birds of scrub and large forest clearings appear restricted to high altitudes in the region.

Whytock & Morgan (2010) mentioned a few more non-forest species, such as Intermediate Egret *Egretta intermedia*, African Fish Eagle *Haliaeetus vocifer*, Long-legged Pipit *Anthus pallidiventris* (for which no habitat was ticked in their Table 1) and Bronze Mannikin *Spermestes cucullata*. The Fish Eagle is listed under Habitat 3 (secondary forest and farmbush), which suggests it was a wanderer, as this is a species

of large rivers (perhaps originating from the larger Nkam river outside Ebo). The presence of the pipit and egret in the Ebo forest or even boundary villages is surprising as these species require very open habitats, but then Whytock & Morgan (2010) did not explain the boundaries of what they call Ebo forest. The proposed National Park is likely to exclude all villages (now on the boundary of the forest reserve) and some of the more degraded habitats; thus it seems premature to calculate or propose a total number of bird species for the area. Both Dowsett-Lemaire & Dowsett (2001) and the present paper include enough details on locations of observations for future reference, and it is likely that a number of species of farmbush and villages listed by both Whytock & Morgan (2010) and Dowsett-Lemaire & Dowsett (2001) will be excluded once the boundaries of the proposed national park become known.

Dowsett-Lemaire & Dowsett (2001) also dealt with some important forests to the north of Ebo: Ndokbou (which is contiguous), Makombé (west of Ndokbou) and Mt Nlonako. Ndokbou and Makombé are included together with Ebo in Important Bird Area CM026 (Fishpool & Evans 2001). These two forests are now a 30-year logging concession certified by the Forest Stewardship Council (R. Whytock *in litt.* 2011).

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Occurrence and breeding of swifts Apodidae and swallows Hirundinidae near Wa in northern Ghana, March–May 2010

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Summary

Numbers and breeding activity of swifts Apodidae and swallows Hirundinidae were monitored between 22 March and 8 May 2010, during the late dry and early wet seasons, along two roads near Wa, in Upper West Region, Ghana. Fifteen species were recorded. Species richness was similar on both transects but relative abundance was higher on the transect nearer the Black Volta river, especially after the onset of the rains when numbers of Red-chested/Barn Swallows *Hirundo lucida* and *H. rustica*, Lesser-striped Swallow *H. abyssinica*, Pied-winged Swallow *H. leucosoma*, Common Swift *Apus apus*, White-rumped Swift *A. caffer* and Little Swift *A. affinis* increased significantly. Breeding activity was similar on both transects. Wire-tailed Swallow *H. smithii* was the only species breeding at the start of the study, but by early May, Lesser-striped, Red-chested and Pied-winged swallows, and White-rumped Swift, Little Swift and possibly Palm Swift *Cypsiurus parvus* had all begun to nest.

Résumé

Apparition et reproduction de martinets Apodidae et d’hirondelles Hirundinidae près de Wa au Nord du Ghana, mars-mai 2010. Les nombres de martinets Apodidae et d’hirondelles Hirundinidae ainsi que leur reproduction ont été suivis entre le 22 mars et le 8 mai 2010, en fin de saison sèche et au début de la saison des pluies, le long de deux routes près de Wa, en Région du Upper West, au Ghana. Quinze espèces ont été enregistrées. La richesse spécifique était similaire sur les deux transects mais l’abondance relative était plus importante sur le transect le plus proche de la rivière Volta Noire, particulièrement après l’arrivée des pluies quand le nombre des Hirondelles de Guinée et rustiques *Hirundo lucida/rustica*, des Hirondelles

striées *H. abyssinica*, des Hirondelles à ailes tachetées *H. leucosoma*, des Martinets noirs *Apus apus*, des Martinets cafre *A. caffer* et des Martinets des maisons *A. affinis* a augmenté significativement. L'activité liée à la reproduction a été similaire sur les deux transects. L'Hirondelle à longs brins *H. smithii* était la seule espèce en reproduction au début de l'étude, mais au début de mai, les Hirondelles striées, les Hirondelles de Guinée et les Hirondelles à ailes tachetées, ainsi que les Martinets cafre, les Martinets des maisons et peut-être les Martinets des palmes *Cypsiurus parvus* avaient tous commencé à nidifier.

Introduction

With the exception of an annotated bird-list compiled at Tumu (10°52'N, 1°59'W) in 1968–9 (Sutton 1970), no previous information on the birds of Upper West Region in Ghana has been published. From late March to early May 2010, numbers and breeding activity of swallows Hirundinidae and swifts Apodidae were monitored near the regional capital, Wa, as part of a broader study aimed at assessing the impact on non-target fauna of an aerial spraying operation carried out to suppress populations of tsetse flies *Glossina tachinoides* and *G. palpalis gambiensis*. The spraying operation was only partially successful, and no evidence of harmful effects on non-target fauna was found (I.F. Grant *in litt.*, pers. obs., see below). The results of the monitoring are reported below.

Study area and methods

Swallows and swifts were counted along two transects, one 22.3 km long, in a sprayed area between Dorimon and Wechiau, and the other 30.2 km long in the unsprayed area on the Wa–Mangwe road (Fig. 1). Initial sightings were made by four observers facing forward in a slow-moving (< 30 k.p.h.), hard-topped vehicle that stopped as required to allow adequate observation. All sightings, irrespective of distance from the observer, were recorded against distance from the start of the transect. Counting began between 6h45 and 7h00 at Dorimon (10°2'1"N, 2°41'17"W) and concluded at c. 8h10 in Wechiau (9°50'9"N, 2°41'1"W). A second count was made on the return journey from Wechiau, starting at 8h30. However, numbers were almost invariably higher on the first count (*e.g.* Red-chested/Barn swallows: Sign test, $n = 24$, $P = 0.003$) and data from the second count have therefore been disregarded for all species. Counting on the unsprayed transect began in Wa (10°3'53"N, 2°29'29"W) at 6h30 h and ended c. 1.5–2 h later at Mangwe (9°57'9"N, 2°14'20"W). Rather than transforming counts to normalise the data, the non-parametric Mann-Whitney U-test has been used to examine seasonal differences in numbers.

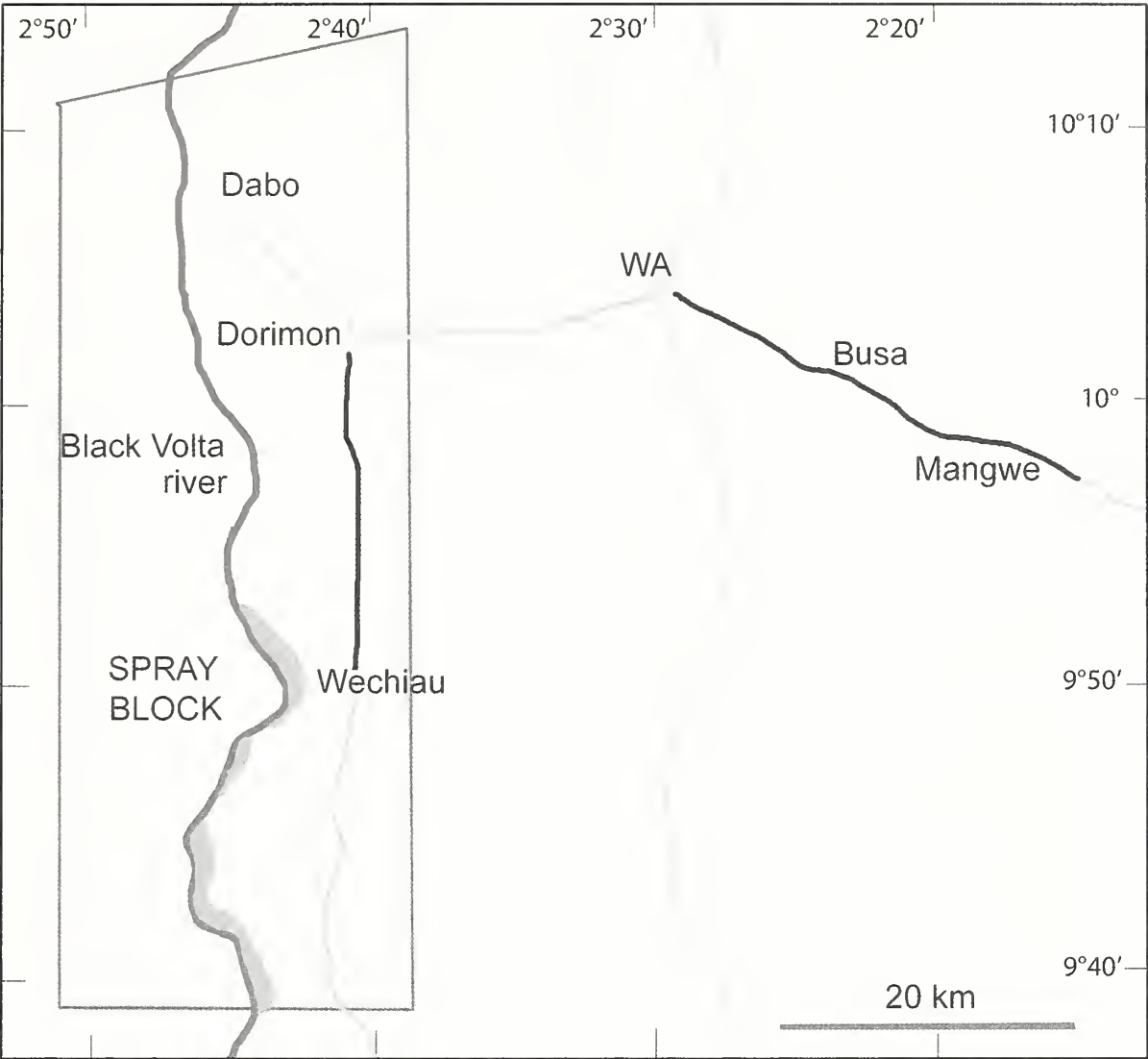


Figure 1. The study area, with road transects shown in black.

In addition to the road counts, numbers of Little Swifts over Wechiau township, at Busa in the unsprayed area, and of Palm Swifts at Dabo school in the sprayed area (but not on a transect: 10°6'59"N, 2°46'4"W), were also counted daily.

Culverts under the road were checked periodically for active swallow and swift nests. After the final spray, a Ridgid SeeSnake endoscope with a 9.5 mm diameter head was used to inspect the contents of retort-shaped swallow nests.

Low voltage power transmission lines run alongside both roads, providing conspicuous perches for swallows and other birds. Both roads pass through gently undulating Guinea Savanna that has been heavily degraded by shifting cultivation and fire, and by the cutting of trees for fuelwood, timber and browse. The dominant tree was the Shea Butter Tree *Butyrospermum paradoxum*. Despite their similarities in vegetation and land use, the two sample areas differ in other respects. The Dorimon–Wechiau road, which lies 5–10 km east of the Black Volta river, is underlain by

sedimentary rocks (slates, phyllites, schists, tuffs and greywackes) and is lower lying (< 275 m altitude), better watered, and more heavily settled than the area beside the Wa–Mangwe road. The latter crosses volcanic granitoid rocks on higher ground (> 325 m). Thus the Dorimon–Wechiau area is probably more favourable for insects and insectivorous birds than the area between Wa and Mangwe.

Spraying to suppress tsetse populations was carried out at night by aircraft flying parallel transects 270 m apart a few metres above the tree canopy, though higher in the vicinity of the numerous cellular phone masts. An area of *c.* 7530 km² in Upper West Region of Ghana and neighbouring Burkina Faso was sprayed. Four spray treatments were made of the entire area with a further three of heavily infested areas on the banks of the Black Volta river. Spraying of the area between Dorimon and Wechiau took place between 6 April and 6 May (Table 1). The insecticide used was deltamethrin, which was applied as an aerosol in ultra-low volume at the rate of 0.33–0.35 g active ingredient ha⁻¹. The fate of the insecticide is unknown but meteorological conditions were generally unfavourable for spraying and some of the spray may have dispersed into the atmosphere rather than reaching target sites near the ground.

The start of the spraying operation had been delayed by poor visibility due to a persistent *harmattan*, with very hot (daily maxima > 40°C), very dry (relative humidity RH < 10 %), dusty northeast winds. Conditions ameliorated in the first few days of April and light southwesterly winds set in. Heavy rain fell overnight on 5–6 April (Table 1), flooding roadside borrow pits and drainage culverts on the Dorimon transect. With the onset of the rains, southwesterly winds prevailed; the RH increased to over 60 %, and daily maximum temperatures fell 5–10°C. Shallow temperature inversions were noted on some days around dawn.

Results

Counts are summarised in Table 2. The median and range, rather than mean and standard error, are given because the means for some species appeared to be skewed by the inclusion of occasional high counts, perhaps due to passage on migration. Under these circumstances the median better expresses the “typical” number present.

***Apus apus* Common Swift.** Seen between 9 April and the end of the study; on the Dorimon–Wechiau transect, significantly more numerous after the onset of the rains (Table 2). Flocks of 30–150 birds were noted moving northwest on 14 April, 24–26 April and 3–6 May.

***A. affinis* Little Swift.** Flocks were seen regularly over Wechiau and Busa. Numbers increased in both areas after the rains began and a breeding colony with 11 nests was found under the eaves of the Wechiau mosque on 28 April.

***A. caffer* White-rumped Swift.** Seen intermittently in small numbers on both transects, on the Dorimon–Wechiau transect more commonly after the onset of the

Table 1. Key dates in the monitoring programme.

Date	Rainfall in Wa (mm)	Event
22 March		Monitoring began
5 April	31	
6/7 April		Dorimon transect sprayed
9 April		RJD left; WZ continued monitoring
13 April	11.5	
15 April	43	
15/16 April		Dorimon transect sprayed
19 April	1	
21 April		Black Volta river sprayed
22 April	72.5	
24/25 April		Dorimon transect sprayed
26 April	29	
30 April		Black Volta river sprayed
1 May	15.5	
5 May	Trace	RJD resumed monitoring
5–6 May		Dorimon transect and Black Volta river sprayed
8 May		Monitoring ended

Table 2. Counts of swifts, martins and swallows between Dorimon and Wechiau, and Wa and Mangwe. Dry season = up to 5 April; wet season = 6 April onwards. Numbers are median (minimum–maximum) counts. Significance of differences was assessed using the Mann-Whitney U test; ns indicates $P > 0.05$.

	Dorimon–Wechiau			Wa–Mangwe		
	Dry season	Wet season	<i>P</i>	Dry season	Wet season	<i>P</i>
Number of counts	9	18		4	6	
Common Swift	0	2 (0–200)	<0.025	0	3 (0–130)	ns
Little Swift	9 (0–17)	15 (5–68)	<0.025	0 (0–8)	9 (0–20)	ns
White-rumped Swift	0 (0–3)	2 (0–19)	<0.05	0 (0–4)	0 (0–36)	ns
Palm Swift	4 (0–8)	4 (0–11)	ns	0	0 (0–2)	ns
Sand Martin	0 (0–1)	0	ns	0	0	-
Grey-rumped Swallow	0	0	-	0	0 (0–2)	ns
Red-chested/Barn swallows	36 (13–73)	131 (61–302)	<0.001	15 (5–23)	16 (13–25)	ns
Wire-tailed Swallow	1 (0–2)	2 (0–8)	ns	3 (0–4)	4 (0–6)	ns
Lesser-striped Swallow	20 (13–28)	31 (22–57)	<0.001	21 (18–24)	24 (23–31)	ns
Red-rumped Swallow	0	0 (0–6)	ns	0 (0–1)	1 (0–4)	ns
Mosque Swallow	0	0 (0–5)	ns	0	2 (0–10)	ns
Rufous-chested Swallow	1 (0–2)	0 (0–2)	ns	0	0	-
Pied-winged Swallow	3 (0–15)	6 (0–18)	<0.05	0	1 (0–3)	ns
House Martin	0 (0–20)	0 (0–20)	ns	0 (0–3)	0	ns

rains. Many of the retort-shaped swallow nests found in culverts showed evidence of previous use by swifts, with feathers stuck to the mouths of the nest chambers. Two nests, one on each transect, were occupied by White-rumped Swifts at the end of the study: both contained a single egg, and both had probably been built originally by Lesser-striped Swallows *Hirundo abyssinica*.

***Cypsiurus parvus* Palm Swift.** Up to 11 were seen on the Dorimon transect, including six or seven that frequented palm trees on the edge of the village. Up to nine were also seen regularly around a palm tree to the north of the transect, in the school grounds at Dabo. Up to two were seen on the Wa transect. There was no evidence of seasonal change in numbers but one pair was suspected of breeding at Dabo at the end of the study.

***Riparia riparia* Sand Martin.** One amongst migrating House Martins and Barn Swallows near Wechiau, 31 March.

***Pseudhirundo griseopyga* Grey-rumped Swallow.** The only record was of two on the Wa–Mangwe road, 19 April.

***Hirundo lucida* Red-chested Swallow and *H. rustica* Barn Swallow.** No attempt was made to separate Red-chested and Barn swallows routinely, due to their similarity, the large numbers present, and time constraints. Flocks of migrating Barn Swallows, together with House Martins, were noted in late March, but photographs of several groups taken in May show only immature Red-chested Swallows. Numbers increased significantly on the Dorimon transect with the onset of the rains, but no similar influx occurred on the transect from Wa, where they were less common throughout the study (Fig. 2). A Red-chested Swallow nest with one egg was found in a culvert beneath the Dorimon–Wechiau road on 9 May.

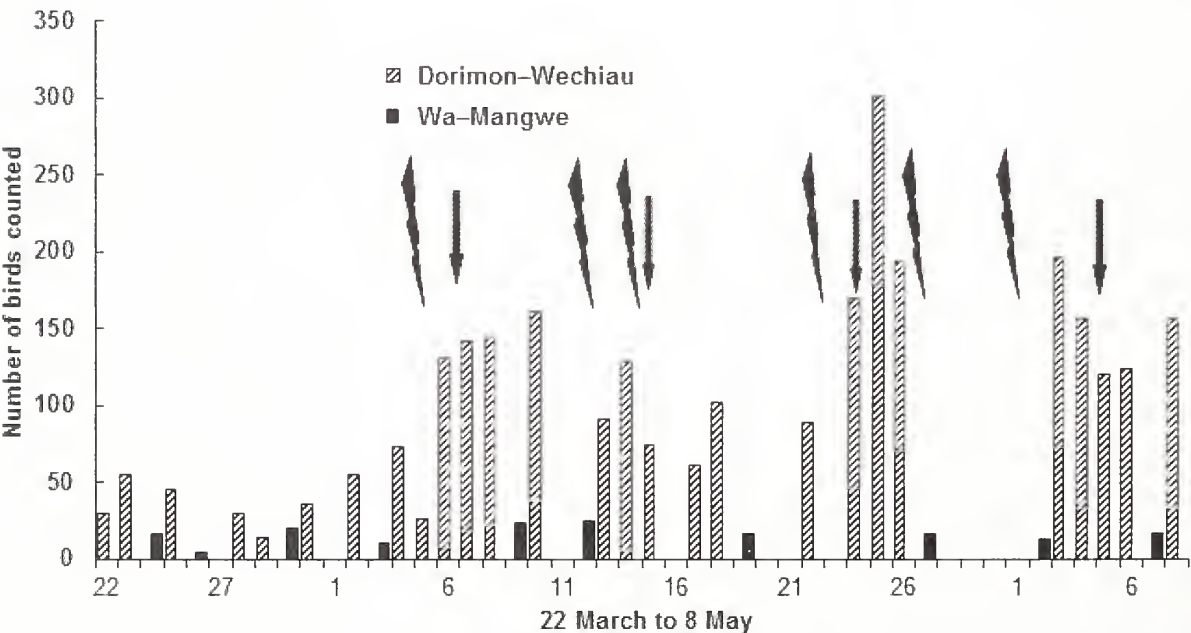


Figure 2. Counts of Red-chested and Barn swallows. All counts are shown (none had a count of zero birds). Flashes = rainfall; arrows = spray treatment.

***Hirundo smithii* Wire-tailed Swallow.** Small numbers present throughout the study on both transects, with up to eight between Dorimon and Wechiau and six on the Wa–Mangwe road. There was no evidence of a seasonal change in abundance. Breeding was in progress in both areas at the start of the study. A nest in a culvert near Wechiau contained two eggs on 25 March and three on 29 March but the chicks were probably taken by children in mid-April shortly before fledging. On the Wa transect, one nest held two eggs on 26 and 30 March and two chicks on 9 April. On 19 April one chick remained in the nest, while the second had fledged and was seen nearby.

***H. abyssinica* Lesser-striped Swallow.** Common on both transects throughout the study, and the most numerous species on the Wa–Mangwe road. Numbers increased significantly on the Dorimon transect with the onset of the rains but no comparable increase occurred on the Wa transect. Family parties were present on both transects at the start of the study but had dispersed by the end, leaving populations mainly comprised of pairs. Nest building began immediately after the first rain and by the end of the study there were three nests each with four eggs on the Dorimon transect, and one nest with four eggs on the Wa–Mangwe road. A badly decomposed adult was found in an old nest on the Wa transect but the cause of death was not determined.

***H. daurica* Red-rumped Swallow.** Present in small numbers on both transects with no evidence of change.

***H. senegalensis* Mosque Swallow.** Seen in small numbers on both transects following the onset of the rains.

***H. semirufa* Rufous-chested Swallow.** Seen in small numbers throughout the study on the Dorimon transect but not recorded along the Wa–Mangwa road.

***H. leucosoma* Pied-winged Swallow.** Present throughout the study on both transects, with a significant increase occurring on the Dorimon–Wechiau road after the onset of the rains. A newly lined but empty nest was found in a culvert on the Dorimon transect on 9 May.

***Delichon urbicum* House Martin.** Seen infrequently (9 days out of 27) on the Dorimon transect, in flocks of up to 20 birds, between 31 March and 3 May. On the Wa–Mangwe road, one record of three birds on 3 April.

Discussion

Deltamethrin aerosols applied for tsetse-fly control in southern Africa are known to have short-lived “knock-down” effects on a broad spectrum of arthropods, which may result in their greater vulnerability to predation and reduced population size (SEMG 1987, 1993). In ideal conditions, the effects of spray drift may occur up to 40 km downwind (pers. obs.). However, no effects of this spraying operation were detected in bats or birds (pers. obs.) or in non-target terrestrial and aquatic arthropods (I.F. Grant *in litt.*). A lack of any significant impact on the prey of swallows, *i.e.* small insects, is confirmed by the lack of any change in swallow abundance before and after

each spray treatment. Red-chested/Barn and Lesser-striped swallow numbers in the three days before each spray cycle, for example, were similar to those recorded in the three days immediately afterwards (Mann-Whitney U-test, pre-spray counts = 11, post-spray counts = 8, $P > 0.05$, for both taxa).

The most dramatic influx of Red-chested/Barn swallows to the sprayed area occurred on 6 April, the day after the first heavy rain had fallen and before the area was sprayed. Spraying during the previous night had taken place some 22–42 km to the north, but the wind at the time was southeast Force 2, *i.e.* blowing spray droplets gently away from rather than towards the study area. It was therefore concluded that spraying had no effect on the numbers of those species studied.

While the diversity of swift and swallow species was similar on the two transects, relative abundance was generally greater on the Dorimon transect, especially after the rains began, when numbers of Red-chested/Barn, Lesser-striped and Pied-winged swallows, and Common, White-rumped and Little swifts all increased significantly on the Dorimon transect with no comparable increase on the Wa transect (Table 3). It was clear that migrants favoured the more humid, riverine corridor of the Black Volta river, where food may have been more abundant, rather than the drier uplands of the Wa–Mangwe transect.

No breeding activity was recorded at the start of the study except in the Wire-tailed Swallow, but with the onset of the rains, Lesser-striped Swallows began collecting mud immediately and other species began to prospect for nest sites in culverts under the roads. By early May, Lesser-striped, Red-chested and Pied-winged swallows, and White-rumped, Little and possibly Palm swifts had all begun to breed, confirming the lack of any adverse impact of spraying.

The bird-life in much of Africa is threatened by habitat destruction caused mainly by a rapidly expanding human population that is heavily dependent upon subsistence farming and wood fuel. The impact of these changes on bird populations is largely unknown as monitoring schemes are either non-existent or still in their infancy, *e.g.* in Uganda and Botswana. The Upper West Region of Ghana is in many ways typical, undergoing rapid environmental change and lacking any previous replicable observations on bird populations. The sites and methods used in this study could easily be used for repeat counts by some of the numerous visitors to the nearby Wechiau Hippo Sanctuary, but a suitable forum for recording their observations is presently non-existent.

Acknowledgments

The work was carried out under contract with the Ministry of Agriculture, Ghana, and we thank Mr Charles Mahama (Project Coordinator, Multinational Project for the Creation of Sustainable Tsetse and Trypanosomiasis Free Areas in East and West Africa) and his staff, for their support. We also thank Dr Richard Suu-Ire, Mr Joseph

Yaw Oppong and Mr Anatole Roger Dipama for assistance in the field, and Dr I.F. Grant for his comments on the manuscript.

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Short Notes — Notes Courtes

Eurasian Wigeon *Anas penelope*, a new species for The Gambia

On 22 January 2010, we visited rice fields near Madina-Sapu in the Lower River Division of The Gambia (13°49'N, 15°25'W). Several species of waders, herons and raptors were sighted both in and around the fields. Among them a duck was discovered which appeared to be a male Eurasian Wigeon *Anas penelope*. This was the only duck in the area. It stood in the water of a rice paddy at a distance of *c.* 100 m, and was observed with binoculars and telescopes. It stopped foraging at the moment of discovery and started to walk and swim around slowly for a few minutes. Then it flew into the adjacent rice paddy where it resumed foraging. Total observation time was *c.* 15–20 min., during which several photographs were taken (Fig. 1). Afterwards the duck remained in the area.

The bird was a medium-sized dabbling duck with short neck, rounded head and small bill. The pointed tail made it look slender. The bill was short, dull blue with a black tip. The legs were black (but partly covered with mud). The eye was dark. The head was chestnut brown, including forehead and crown, and darker around the eye. The mantle was dark grey with some chestnut-brown feathers. The neck and upper breast were chestnut brown, distinctly divided from the whitish lower breast, and the under-parts were mottled chestnut brown and grey. The white belly was darkened by mud and the under tail-coverts were white with increasing black mottling towards the tip of the tail. The tertials and wing tips were blackish, and the speculum dark without a white trailing edge. The under wing-coverts were uniform pale grey. The outer tail-feathers had dark centres and white edges. These characteristics are distinctive of Eurasian Wigeon. The uniform grey underparts of the wing, seen when the bird flew for a short distance, ruled out Northern Pintail *A. acuta* and American Wigeon *A. americana*. The chestnut-brown head indicates that this bird was a male. The absence of a yellowish forehead is typical for first-winter males and males in eclipse plumage. In first-winter birds, the belly often shows a mottled grey pattern, while the wing lacks the distinctive white panel of adults and often has uniform grey coverts (Svensson *et al.* 2009, Duivendijk 2010). We thus conclude that this was a first-winter male Eurasian Wigeon.

The Eurasian Wigeon breeds in northern Eurasia and winters from southern Eurasia to North Africa. In its wintering areas the species prefers coastal regions with shallow fresh- or salt-water marshes, flooded grassland and lagoons (Cramp & Simmons 1977, Hoyo *et al.* 1992). To our knowledge, no records of Eurasian Wigeon have so far been documented for The Gambia (Vestergaard-Jensen & Kirkeby 1980, Gore 1990, Barlow *et al.* 2007, Borrow & Demey 2004). Even though West Africa, including The Gambia, offers numerous suitable wetlands in the form of river deltas,

floodplain marshes and rice fields, the Eurasian Wigeon remains a scarce winter visitor south of the Sahara, where its regular occurrence is known only for the Inner Niger Delta and the Atlantic coast from Mauritania to northern Senegal (Giraudoux *et al.* 1988, Borrow & Demey 2004).



Figure 1. First-winter male Eurasian Wigeon *Anas penelope* at a rice paddy near Madina-Sapu, The Gambia, 22 Jan 2010 (photo: Louis de Vos).

The possibility that this bird originated from an ornamental waterfowl collection cannot be ruled out completely. However, the bird was not ringed and showed no signs of captivity such as unnatural behaviour, abnormal feather wear or damaged bill or feet, and we are not aware of any ornamental waterfowl collections in the Senegambia region. Furthermore, considering the occurrence of the species in northern Senegal, a wild origin seems more likely.

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First record and probable breeding of African Pitta *Pitta angolensis* in Omo Forest Reserve, southwest Nigeria

The Omo Forest in southwestern Nigeria is an Important Bird Area and Biosphere Reserve, known to hold at least 74 bird species restricted to the Guinea-Congo Forests Biome (Ezealor 2001). In spite of effort by the Nigerian Conservation Foundation and World Bank to secure the forest, its 4.6 km² Strict Nature Reserve and the 142 km² Biosphere Extension Areas around it are still experiencing severe degradation due to excessive exploitation of timber, agricultural encroachment and poaching (Ezealor 2001, Olmos & Turshak 2009, pers. obs.).

On the damp, calm, cloudy mornings of 27 and 30 May 2012, at 7h00 and 10h00 respectively, we caught two African Pittas *Pitta angolensis* (Figs 1 and 2) in the lower pockets of mist nets in the primary forest of Omo Forest Reserve, at altitude *c.* 75 m near Erin Camp (6°55'6"N, 4°19'10"E), at two locations separated by ≤ 60 m. Biometrics of the two birds were: wing length 114, 117 mm; tarsus 37, 34 mm; bill 22, 23 mm; head 49, 48 mm; tail 44, 40 mm; weight 69, 60g. One had an active brood patch (Fig. 2).



Figure 1. African Pitta mist-netted in Omo Forest Reserve, 30 May 2012.

This is the first record of African Pitta for Omo Forest Reserve (Green *et al.* 2007, Olmos & Turshak 2009), and provides a strong indication of local breeding. There are no breeding records of this species in Nigeria (Elgood *et al.* 2001).

This is contribution no. 55 from the A.P Leventis Ornithological Research Institute (APLORI). We are grateful to Dr A.P. Leventis for funding APLORI, to the National Centre for Biosystematics (Natural History Museum, University of Oslo) and the Research Council of Norway for sponsoring OTC's field work in Nigeria, and to Nicholas Wicks and Clifford Omonu who assisted during field work.

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Figure 2. Brood patch of African Pitta, Omo Forest Reserve, 27 May 2012.

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News & Letters — Nouvelles & Lettres

New internet resources on Benin

We are pleased to announce that the Benin pages of the African Bird Club web site <www.africanbirdclub.org/countries/Benin/introduction.html> have undergone a major revision to include new pages on geography, IBA, hotspots, visiting and conservation, as well as many new photographs, links and an up-to-date country checklist. They now provide a wealth of information on bird species and where to find them, special sites with conservation potential, and practical information about Benin, which should be helpful to tourists, as well as to residents planning off-the-beaten-track trips to learn about their local birds.

Benin has great potential as an emerging ecotourism and birding destination and we hope that you will find the site useful and attractive. Many thanks are due to John Caddick, Bob Dowsett and Françoise Dowsett-Lemaire for their work to produce this revision.

Bruno Portier

African Bird Club country recorder and checklist compiler for Benin
<brunoportier@yahoo.fr>

Society Notices — Informations de la Société

429 828-1001

Peter Denzil Alexander-Marrack (1946–2011)

Peter Alexander-Marrack was born in 1946 in Hammersmith, London, and educated at Hendon County Grammar School, and Corpus Christi College, Cambridge (1965–71). He obtained a double first in Natural Sciences, specialising in Geology, and gained a Ph.D. for his geological work in east Greenland. He was a member of the Cambridge Bird Club, and also took part in a university botanical expedition to Turkey.

Peter joined the Shell Group in 1971, specialising in the geological interpretation of seismic data for oil and gas exploration. After basic training, he worked in the Netherlands, Brunei and Sarawak, Nigeria (1977–81), Thailand, Gabon (1986–90) and Norway. In 1994, he married Jo Draisma, whom he had first met in Borneo.

Peter was a member of the Nigerian Field Society and was Secretary of the Society's Resident Committee from 1980–1. He joined the Nigerian Ornithologists' Society in 1977 and was a member of WAOS ever since. He wrote three papers on birds in Nigeria and Gabon for *Malimbus* (see below), and also helped the Editor by refereeing many papers and reviewing publications on central Africa, including after he moved back to Europe. In Norway Peter and Jo joined the Norsk Ornitologisk Forening and, before they left, NOF asked Peter to give a presentation about birds in Gabon.

Peter was always a birdwatcher, and was also interested in butterflies, dragonflies, spiders, robber flies, orchids and nature in general. In 2000, he took early retirement and he and Jo moved to Heerenveen in the Netherlands, where they enjoyed many trips looking at plant and animal life, and he also researched his family history. In January 2010, he was diagnosed with an incurable cancer, which at first confined him to a wheel chair though later he was only able to watch the garden birds from his bed. But he still enjoyed reading *Malimbus* and appreciated an article in the September 2011 issue on the Loango Weaver, which he had studied himself in Gabon. He died on 25 December 2011.

Council is very grateful to Jo Alexander-Marrack for contributing to this small memorial, and we extend our sympathies and best wishes to her on behalf of Peter's friends in the Society.

W.A.O.S. Council

P.D. Alexander-Marrack: articles in *Malimbus* / articles dans *Malimbus*

- ALEXANDER-MARRACK P. (1992) Nearctic vagrant waders in the Cap Lopez area, Gabon. *Malimbus* 14: 7–10.
- ALEXANDER-MARRACK P. (1994) Notes on a breeding colony of the African River Martin *Pseudochelidon eurystomina* in Gabon. *Malimbus* 16: 1–9.
- ALEXANDER-MARRACK P. (1994) Reviews of *Enquête Faunistique dans la Forêt du Mayombe et Check-liste des Oiseaux et des Mammifères du Congo* (F. Dowsett-Lemaire & R.J. Dowsett, 1989) and of *Flore et Faune du Bassin du Kouilou (Congo) et leur Exploitation* (ed. by R.J. Dowsett & F. Dowsett-Lemaire, 1991). *Malimbus* 16: 61–62.
- ALEXANDER-MARRACK P.D., AARONSON M.J., FARMER R., HOUSTON W.H. & MILLS T.R. (1985) Some changes in the bird fauna of Lagos, Nigeria. *Malimbus* 7: 121–127.

Peter Denzil Alexander-Marrack (1946–2011)

Peter Alexander-Marrack naquit en 1946 à Hammersmith, Londres, et fut élève du lycée du Hendon, puis du Collège Corpus Christi à Cambridge (1965–71). Il obtint sa licence avec distinction en Sciences Naturelles, spécialité Géologie, et un Ph.D. pour son étude géologique dans l'Est du Groenland. Il fut membre du Cambridge Bird Club, et participa aussi à une expédition botanique de l'université en Turquie.

Peter rejoignit le groupe Shell en 1971, en se spécialisant dans l'interprétation géologique des données sismiques de la recherche de pétrole et de gaz. Après ses débuts professionnels, il fut affecté aux Pays-Bas, à Brunei et Sarawak, au Nigeria (1977–81), en Thaïlande, au Gabon (1986–90) et en Norvège. En 1994, il épousa Jo Draisma, qu'il avait rencontrée à Bornéo.

Peter était membre de la Nigerian Field Society et fut Secrétaire de sa Comité de l'Association des Résidents en 1980–1. Il adhéra à la Nigerian Ornithologists' Society en 1977 et a toujours été membre de la SOOA depuis lors. Il est l'auteur de trois articles sur les oiseaux du Nigeria et du Gabon pour *Malimbus* (voir ci-dessus) et a également aidé le Rédacteur en chef par la relecture de nombreux articles et la recension de publications sur l'Afrique centrale, y compris après son retour en Europe. En Norvège, Peter et Jo s'inscrivirent au Norsk Ornitologisk Forening et, avant leur départ, le NOF demanda à Peter de faire un exposé sur les oiseaux du Gabon.

Peter a toujours été un birdwatcher, et il s'intéressa aussi aux papillons, libellules, araignées, mouches à toison, orchidées et à la nature en général. En 2000, il partit tôt à la retraite et lui et Jo s'établirent à Heerenveen dans les Pays-Bas, où ils prirent plaisir à faire de nombreux voyages pour observer les plantes et la vie animale, et il effectua aussi des recherches sur l'histoire de sa famille. En janvier 2010, on lui trouva un cancer incurable, qui commença par le confiner dans un fauteuil roulant et plus tard il fut réduit à observer de son lit les oiseaux du jardin. Mais il prenait encore plaisir à la lecture de *Malimbus* et il apprécia un article du numéro de septembre 2011 sur le Tisserin à bec grêle, qu'il avait lui-même étudié au Gabon. Il est décédé le 25 décembre 2011.

Le Conseil est très reconnaissant à Jo Alexander-Marrack de sa contribution à cette courte notice, et nous lui exprimons nos condoléances et nos meilleurs vœux de la part de tous les amis de Peter au sein de la Société.

Le Conseil de la S.O.O.A.

Arrears of subscriptions

We had hoped to include a new list of the Members of WAOS with this issue, but have been unable to do so owing to the fact that a substantial number of Members on our current list have not paid their subscriptions. I have been contacting these Members in an attempt to re-establish their subscriptions, but this is a long process and has not yet finished. Would all Members please check their subscription status with me, and provide their e-mail address (for internal use) to facilitate future communication. At the end of this year Council will decide a policy for terminating

the membership of those who have not brought their subscriptions up to date, and we hope to be able to issue a new Members List in 2013.

Tim Dodman, Treasurer and Membership Secretary,
Hundland, Papa Westray, Orkney KW17 2BU, U.K. <tim@timdodman.co.uk>

Arriérés de cotisations

Nous avons espéré inclure une nouvelle liste des Membres de la SOOA dans ce numéro, mais nous n'avons pas été en mesure de le faire en raison de ce qu'un nombre important de Membres sur notre liste actuelle ne sont pas à jour du paiement de leurs cotisations. J'ai entrepris d'entrer en contact avec ces Membres afin qu'ils renouvellent leur inscription, mais c'est une démarche qui prend du temps et se poursuit. Merci à tous les Membres de bien vouloir vérifier l'état de leur inscription avec moi et de me communiquer leur adresse internet (pour un usage interne) afin de faciliter nos échanges. En fin de cette année, le Conseil décidera d'une politique en ce qui concerne le retrait de la liste des membres de ceux qui ne seront pas à jour du paiement de leurs cotisations, et nous espérons être en mesure de publier une nouvelle Liste des Membres en 2013.

Tim Dodman, Trésorier et chargé des adhérents,
Hundland, Papa Westray, Orkney KW17 2BU, U.K. <tim@timdodman.co.uk>

W.A.O.S. membership changes Changements à la liste d'adhérents de la S.O.O.A.

New members — Nouveaux membres

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Tim Dodman
Treasurer and Membership Secretary

Instructions aux Auteurs

Malimbus publie des articles de recherche, des revues de publications et des nouvelles traitant de l'ornithologie ouest-africaine.

Les **Articles** et les **Notes Courtes** doivent être des apports originaux; ceux déjà publiés ailleurs, en partie ou en totalité, seront normalement refusés. Les Notes Courtes sont des articles de moins de 1500 mots (références comprises) ou de quatre pages imprimées. Autant que possible, les manuscrits auront été au préalable soumis à au moins un ornithologue ou biologiste pour un examen minutieux. Les manuscrits seront envoyés pour critique à au moins un lecteur compétent.

Les textes des **Nouvelles & Lettres** ne devraient pas dépasser 1000 mots.

Les **textes** sont acceptés en anglais et en français; la Rédaction pourra aider les auteurs dont la langue maternelle n'est pas l'une de celles-ci. Nous préférons les envois de manuscrits par email (en pièce jointe). Consultez le Rédacteur pour plus de détails, par ex. les logiciels compatibles.

Tous les Articles (mais non les Notes Courtes) comporteront un **Résumé**, n'excédant pas 5% de la longueur totale. Le Résumé mentionnera brièvement les principaux résultats et conclusions de l'Article et ne sera pas un simple compte rendu de ce qui a été fait. Les résumés seront publiés à la fois en anglais et en français (ou dans la langue officielle du pays dans lequel le travail a été réalisé) et seront traduits au mieux par la Rédaction.

La **présentation** des tableaux, chiffres, unités métriques, références, *etc.* doit correspondre à celles des numéros récents. A notez, en particulier: Les noms des auteurs doivent être listés en faisant précéder le nom de famille par le prénom ou des initiales (ex. John A. Smith); les dates seront écrites "2 fév 1990" mais les mois seuls pourront être écrits en entier; les heures seront écrites "6h45", "17h00"; les coordonnées "7°46'N, 16°4'W" (pas de zéros en tête); les nombres jusqu'à dix seront écrits en toutes lettres, excepté devant une unité de mesure (ex. 6 m); les nombres à partir de 11 seront écrits en chiffres sauf au début d'une phrase. Toutes les références citées dans l'article, et aucune autre, doivent figurer dans la bibliographie.

Les **articles sur l'avifaune** doivent comprendre une carte ou un index géographique, incluant tous les endroits cités. Ils doivent comporter quelques brèves indications sur le climat, la topographie, la végétation et les circonstances ou événements inhabituels avant ou pendant l'étude (ex. pluies tardives, *etc.*). Les **listes d'espèces** ne doivent contenir que des données importantes: les listes complètes ne sont justifiées que pour les régions encore non étudiées ou délaissées pendant longtemps. Autrement, ne citer que les espèces sur lesquelles l'étude fournit une information nouvelle sur la répartition, la période de séjour, la reproduction, *etc.* Pour chaque espèce, indiquer l'extension de l'aire de répartition, une estimation d'abondance (*Malimbus* 17: 38) et les données datées sur la reproduction; indiquer le statut migratoire et la période de séjour seulement tels qu'ils ressortent de l'étude. Eventuellement, replacer les données dans le contexte en les comparant brièvement avec une liste régionale de référence. Les longues listes d'espèces peuvent être présentées sous la forme de tableaux (ex. *Malimbus* 25: 4–30, 24: 15–22, 23: 1–22, 1: 22–28, or 1: 49–54) ou sous la forme rédigée des numéros récents. La **séquence taxonomique** et les **noms scientifiques** (et de préférence aussi les **noms vernaculaires**) doivent suivre Borrow & Demey (2001, *Birds of Western Africa*, Christopher Helm, London, avec des noms rectifiés de Borrow & Demey 2004, *Field Guide to the Birds of Western Africa*, Christopher Helm, London), ou *The Birds of Africa* (Brown *et al.* 1982, Urban *et al.* 1986, 1997, Fry *et al.* 1988, Keith *et al.* 1992, Fry & Keith 2000, 2004, Academic Press, London), à moins de donner les raisons de s'écarter de ces auteurs. Un **guide plus complet à l'intention aux auteurs** d'articles sur l'avifaune, comprenant l'échelle d'abondance des espèces conseillée, a été publié dans *Malimbus* 17: 35–39 et une version augmentée et actualisée de celle-ci mise sur le site internet (<http://malimbus.free.fr/instmale.htm>). La Rédaction se fera un plaisir de donner des conseils pour les études spécifiques.

Pour le dessin des **Figures**, et en particulier la taille des caractères, tenir compte des dimensions de la page de *Malimbus*. On préfère les figures préparées sur logiciel graphique approprié et sauvegardées en haute définition. Les fichiers de basse résolution et les impressions de mauvaise qualité seront refusés. Les auteurs sont encouragés à soumettre des **photographies** qui illustrent des points importants de leurs articles. Les photographies doivent être en couleurs et de haute définition. Les figures et les photographies doivent être envoyées comme fichiers de logiciel graphique (par ex. jpg ou tif), et ne pas être incluses dans un fichier de Word et non pas être incluses dans un fichier de Word. Consulter le Rédacteur pour tout renseignement.

Un fichier pdf des Articles et des Notes Courtes, et une copie du numéro de publication seront envoyés gratis à l'auteur ou à l'auteur principal.

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